



MATRIX OLYMPIAD

The Most Innovative Talent Recognition Exam

MATHEMATICS

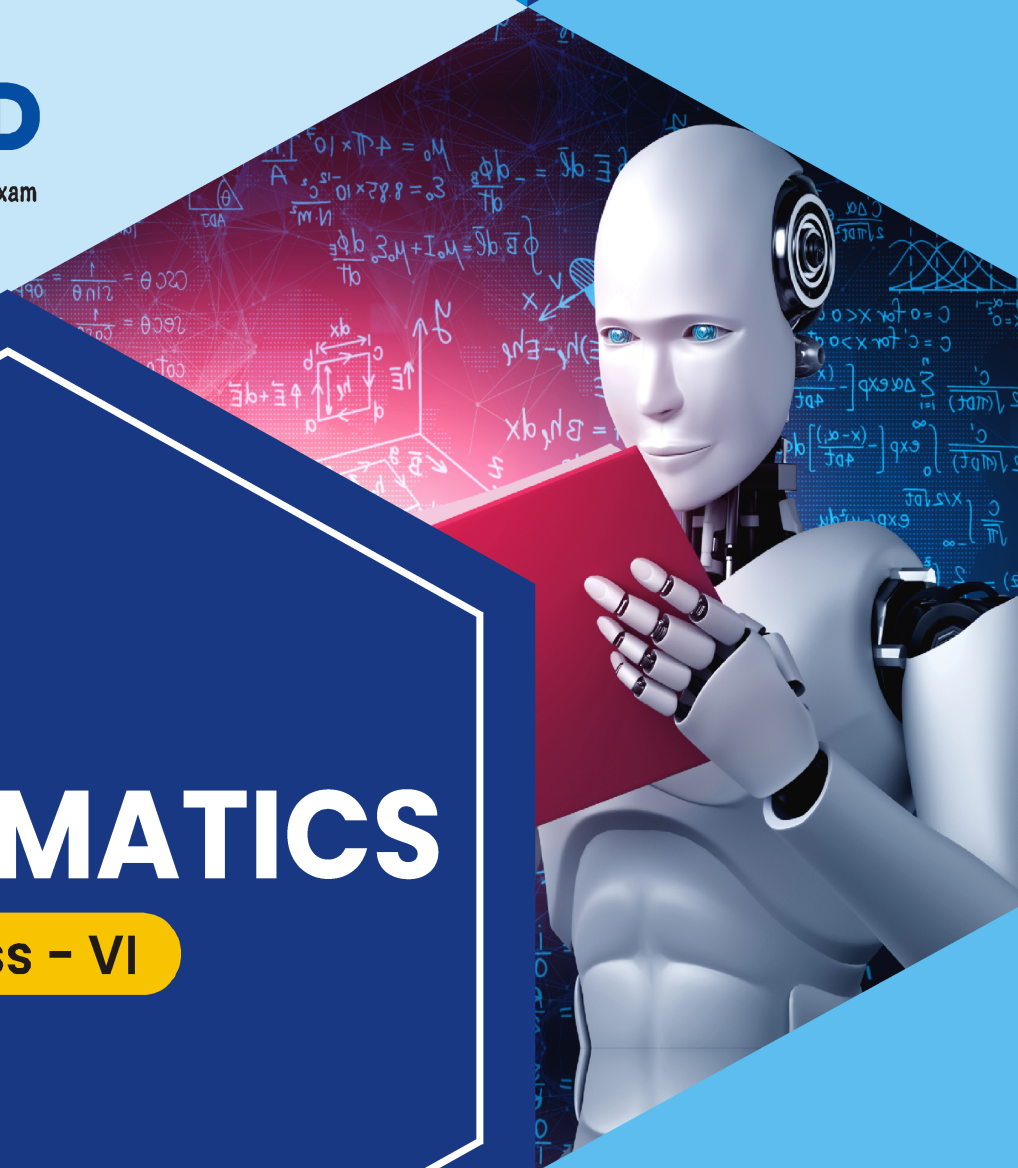
Class - VI



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Few words for the Readers

Dear Reader,

"Matrix Olympiad is established to encourage school students to go a step further than their regular studies, and get a chance and exposure to competition on a wide scale. It also helps students enhance their learning of basic cognitive skills and deeper knowledge of subjects like Science, Mathematics, English, Mental Ability, Social Studies. "Matrix Olympiad helps students nurture their minds for higher targets of tomorrow and enables them to study School for JEE, NEET, CLAT, NDA, Olympiads , NSEJS, NTSE , STSE etc."

The above thought has been our guiding principle while designing and collating the study material for **Matrix Olympiad** . And hence, we hope that this particular material will be helpful towards your preparation for **Matrix Olympiad**.

Our team at **MATRIX** has put in their best efforts for making this particular module interesting and relevant for you. Additional efforts have been made to ensure that the content is easy to understand and error free to the extent possible. However, there might remain some inadvertent errors in answer keys and theoretical portion and we would welcome your valuable feedback regarding the same.

If there are any suggestions for corrections, please write to us at smd@matrixacademy.co.in and we would be highly grateful.

Finally, we would like to end this message by a famous quote by Ernest Hemingway - *"There is no friend as loyal as a book."* So, please give your study material the time and attention it deserves, and it will surely help you reach newer heights in your fight with competition examinations.

With love and best wishes !

Team MATRIX

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INTEGERS

(THE OTHER SIDE OF ZERO)

1

Concepts

Introduction

1. *Reading and writing integers*
2. *Representing Integers on Number lines*
3. *Comparing the values of two integers*
 - 3.1 *Horizontal number line*
 - 3.2 *Vertical number line*
4. *Arranging Integers in Order*
5. *Writing Positive and Negative Integers to Represent Word Descriptions*
6. *Properties of integers*
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Solved Examples

NCERT Solutions

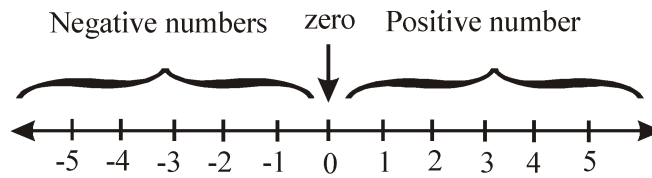
Exercise - I (SCQ Type)

Exercise - II (Board Pattern Type)

Answer Key

INTRODUCTION

Numbers greater than 0 are called positive numbers. Extending the number line to the left of 0 allows us to represent negative numbers, numbers that are less than 0.



When a single + sign or no sign is in front of a number, the number is a positive number. When a single – sign is in front of a number, the number is a negative number.

–5 indicates “negative five”.

5 and + 5 indicate’s “positive five”.

The number 0 is neither positive nor negative.

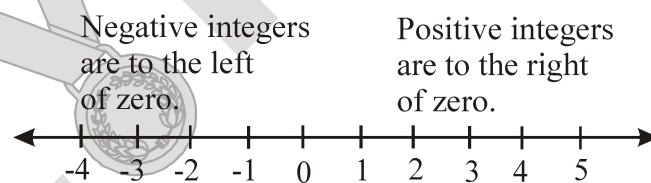
1. READING AND WRITING INTEGERS

- The sign of an integer is read first before the number.
Ex. : –5 is read as ‘negative five’
+9 is read as ‘positive 9’ or simply ‘nine’.
- 0 is an integer but it is not positive nor negative.

2. REPRESENTING INTEGERS ON NUMBER LINES

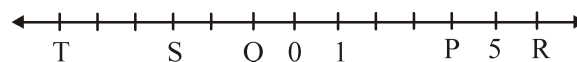
Integers can be represented on a number line.

The number line shows that every integer has an opposite number except ‘0’.



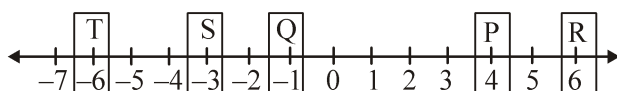
Example 1

Find the values of P, Q, R, S and T on the given number line.



Solution :

We have,



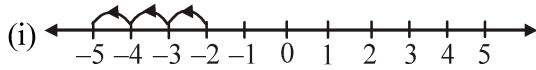
So, P = 4, Q = –1, R = 6, S = –3, T = –6

Example 2

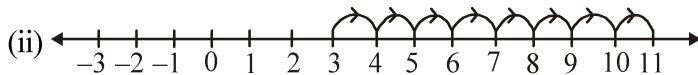
Draw a number line and answer the following :

- (i) If we move 3 number to the left of -2 , which number will we get ?
- (ii) If we move 8 number to the right of 3 , which number will we get ?

Solution :



So, if we move 3 number to the left of -2 , we reach at -5 .



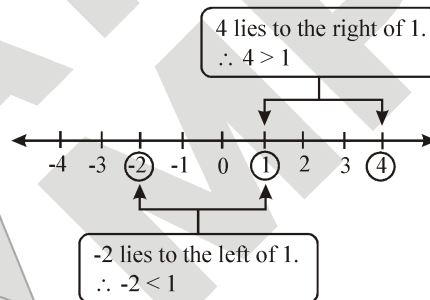
So, if we move 8 number to the right of 3 , we reach at 11 .

3. COMPARING THE VALUES OF TWO INTEGERS

Number line can be used to compare the values of two integers.

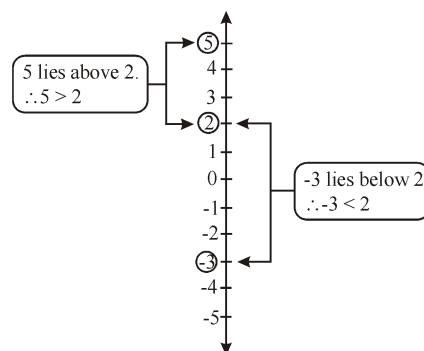
3.1 HORIZONTAL NUMBER LINE

- (A) On a horizontal number line, an integer is greater than the integer on its left.
- (B) On a horizontal number line, an integer is less than the integer on its right.



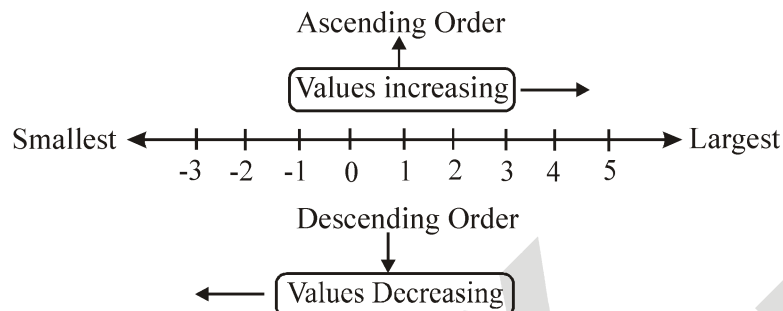
3.2 VERTICAL NUMBER LINE

- (A) On a vertical number line, an integer is greater than the integer below it.
- (B) On a vertical number line, an integer is less than the integer above it.



4. ARRANGING INTEGERS IN ORDER

- Number lines can be used to arrange order, integers in increasing or decreasing order.
- The value of integers on a horizontal number line increases from left to right and decreases from right to left.



5. WRITING POSITIVE AND NEGATIVE INTEGERS TO REPRESENT WORD DESCRIPTIONS

1 A Positive or negative number is used to denote:

(A) An increase or a decrease in value

Ex : (i) Rs. 70 withdrawn is denoted by – Rs. 70.

Ex : (ii) Rs. 70 deposited is denoted by + Rs. 70.

(B) Values more than zero or values less than zero

Ex : (i) -18°C denotes a temperature that is 18°C below 0°C .

Ex : (ii) $+18^{\circ}\text{C}$ denotes a temperature that is 18°C above 0°C .

(C) A positive direction or a negative direction (opposite direction)

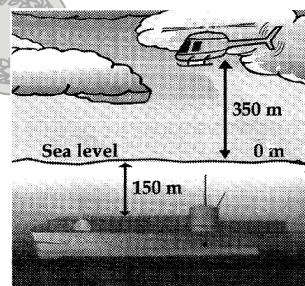
Ex : (i) -20° denotes an anticlockwise rotation of 20° .

Ex : (ii) $+20^{\circ}$ denotes a clockwise rotation of 20° .

Ex : (iii) $+5\text{ m}$ denotes a direction 5 m to the right.

Ex : (iv) -5 m denotes a direction 5 m to the left.

(D) Position above or below sea level



Ex : (i) Sea level is taken as 0 m.

Ex : (ii) The helicopter flies 350 m above sea level or $+350\text{ m}$.

Ex : (iii) The submarine lies 150 m below sea level or -150 m .

6. PROPERTIES OF INTEGERS

6.1 ADDITION AND SUBTRACTION OF INTEGERS

(A) If a and b are two integers then

$$a + b = c$$

where c is also an integer.

(B) For any two integers a and b

$$a + b = b + a$$

Which means that if we change the order of the integers, even then their sum does not change.

(C) For any three integers a, b and c

$$(a + b) + c = a + (b + c)$$

This means that even if we rearrange the integers their sum does not change.

(D) If a is any integer then $a + 0 = a$

This means that the sum of any integer and zero is the integer itself.

Ex.

$$\begin{aligned} -10 + 0 &= -10 \\ 6 + 0 &= 6 \\ -15 + 0 &= -15 \end{aligned}$$

(E) For every integer a (which is not zero) there is another integer $-a$ such that

Ex.

$$\begin{aligned} a + (-a) &= 0 \\ 3 + (-3) &= 0 \\ 5 + (-5) &= 0 \\ 6 + (-6) &= 0 \end{aligned}$$

(F) The difference of any two integers is an integer i.e. If a and b are two integers then $a - b = c$, where c is also an integer.

(G) In the whole numbers, 0 has no predecessor, but in integers -1 is the predecessor of 0, -2 is the predecessor -1 and so on. Thus if a is any integer, then $a - 1$ is its predecessor.

(H) If a is any integer then $a - 0 = a$

Like signs	Unlike signs
$+(+y) = +y$	$+(-y) = -y$
$-(-y) = +y$	$-(+y) = -y$

Example 3

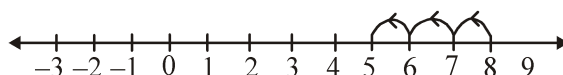
Add the following on the number line.

- (i) 8 and -3 (ii) -5 and 3

Solution :

(i) We have 8 and -3 .

First we mark the integer 8 on the number line and then move 3 steps to the left.

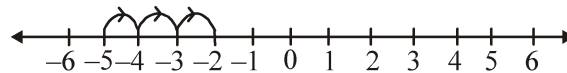


So, we reach at 5.

$$\therefore 8 + (-3) = 5$$

(ii) We have -5 and 3

First we mark the integer -5 on the number line and then move 3 steps to the right.



So, we reach at -2 .

$$\therefore (-5) + 3 = -2$$

Example 4

Subtract the following :

(i) $(-9854) - (3864)$ (ii) $(4239) - (-2105)$

Solution :

(i) $(-9854) - (3864)$

Negative of $3864 = -3864$

$$\therefore (-9854) - (3864) = (-9854) + (-3864) = -(9854 + 3864) = -13718$$

(ii) $4239 - (-2105)$

Negative of $-2105 = 2105$

$$\therefore 4239 - (-2105) = 4239 + (2105) = 6344$$

6.2 MULTIPLYING INTEGERS

- The multiplication of an integer with a positive integer is the repeated addition of the integer.
- Rules for multiplication of integers :

	Integer	×	Integer	=	Product
(i)	(+)	×	(+)	=	+
(ii)	(+)	×	(-)	=	-
(iii)	(-)	×	(+)	=	-
(iv)	(-)	×	(-)	=	+
(v)	(+)	×	0	=	0
(vi)	(-)	×	0	=	0

- (A) The product of two integers is positive when both integers have like signs [as in (i) and (iv)].
 (B) The product of two integers is negative when both integers have unlike signs [as in (ii) and (iii)].
 (C) The product of an integer and zero is always zero [as is (v) and (vi)].

Property 1 : If a and b are integers then $a \times b$ is also an integer

Property 2 : If a and b are two integers then $a \times b = b \times a$

Property 3 : If a , b and c are any three integers then $a \times (b \times c) = (a \times b) \times c$

- (A) When the number of negative integers in a product is ODD, the product is negative.
 (B) When the number of negative integers in a product is EVEN, the product is positive.

6.3 DIVIDING INTEGERS

- The division of an integer with a positive integer is a process of equal grouping or sharing.
- The division of negative integer by a negative integer is also a process of equal grouping.
- Rules for division of integers :

Integer	Integer	Quotient
(A) (+)	÷ (+)	= +
(B) (+)	÷ (-)	= -
(C) (-)	÷ (+)	= -
(D) (-)	÷ (-)	= +
(E) 0	÷ (+)	= 0
(F) 0	÷ (-)	= 0

Property 1 : If ‘a’ and ‘b’ are two integers then $a \div b$ is not always an integer.

Property 2 : For any integer ‘a’ ($a \neq 0$)

$$a \div a = 1 \text{ and } a \div 1 = a$$

Property 3 : For any integer ‘a’ ($a \neq 0$)

$$a \div (-1) = -a, \text{ and } a \div (-a) = -1$$

Property 4 : For any non-zero integer ‘a’, $0 \div a = 0$

7. BODMAS

The order was given by the word BODMAS.

- Where,
- B stands for ‘bracket’
 - O stands for ‘of’
 - D stands for ‘division’
 - M stands for ‘multiplication’
 - A stands for addition’
 - S stands for ‘subtraction’

The following are the different kinds of brackets :

- ‘-’ generally known as the bar bracket or vinculum.
- () generally known as circular brackets or small brackets or parentheses or common brackets.
- { } generally known as curly brackets or flower brackets.
- [] generally known as rectangular, square or big brackets.

We remove in the following order

-
- ()
- { }
- []

SOLVED EXAMPLES

SE. 1

Use integers to represent the following temperatures.

- (A) 18°C below freezing point (0°C)
 (B) 18°C above freezing point (0°C)

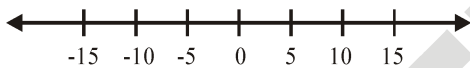
Ans. (A) -18°C
 (B) 18°C

SE. 2

Draw a horizontal and vertical number line to show the following integers.

$-15, -10, -5, 0, 5, 10, 15$

Ans. (A) Horizontal number line:



(B) Vertical number line:

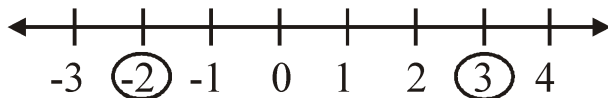


SE. 3

Which integer is smaller, -2 or 3 ?

-2 lies to the left of 3 .
 Therefore, -2 is less than 3 .

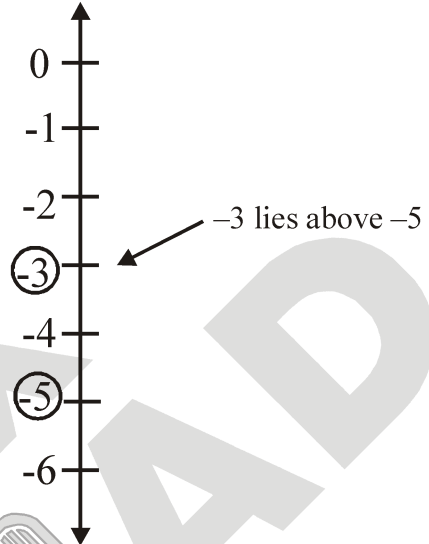
Ans.



Therefore, -2 is smaller integer.

SE. 4

Which integer is greater -3 or -5 ?



Ans. Therefore, -3 is greater than -5

SE. 5

(A) Arrange the following integers in ascending order.

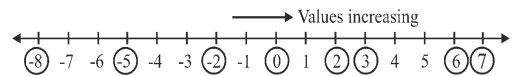
$3, -2, 5, -8, -5, -1$

(A) Arrange the following integers in descending order.

$3, -1, -2, 5, -8, -5$

Ans. Arrange the integers on a number line.

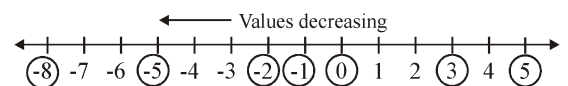
(A) Ascending order: From smallest to largest



\therefore Integers in increasing order:

$-8, -5, -2, -1, 3, 8$

(B) Descending order: From largest to smallest.



\therefore Integers in decreasing order:

$5, 3, -1, -2, -5, -8$

SE. 6

Determine the largest and the smallest integers from the following integers.

-12, 7, 8, 0, -9, 5, -10

Ans. Arrange the integers in ascending order:

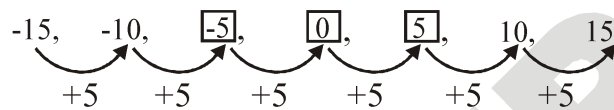
-12, -10, -9, 0, 5, 7, 8

∴ The largest integer is 8 and the smallest integer is -12.

SE. 7

Fill in the blanks in the sequence below.

-15, -10, □, □, □, 10, 15



Ans.

Difference between consecutive integers = $-10 - (-15) = 5$

SE. 8

Use a positive or a negative number to denote each of the following.

- (A) (i) 18 m above sea level
(ii) 8 m below sea level

- (B) (i) Profit of Rs. 188
(ii) Loss of Rs. 254

- (C) (i) 15 km to the east
(ii) 30 km to the west

Ans. (A) (i) + 18 m (ii) - 8 m
(B) (i) + Rs. 188 (ii) -Rs. 254
(C) (i) + 15 km (ii) -30 km

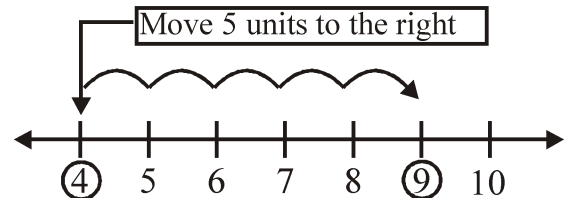
SE. 9

Solve the following

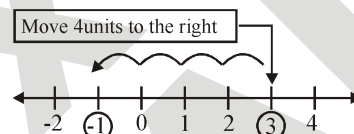
- (A) $4 + (+5)$ (B) $3 + (-4)$

Ans. (A) Start from number 4, move 5 units to the positive direction (+5).

∴ $4 + (+5) = 4 + 5 = 9$



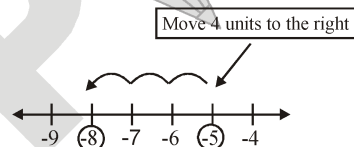
(B) Start from number 3, move 4 units to negative direction (-4).



∴ $3 + (-4) = 3 - 4 = -1$

SE. 10

Evaluate $-5 + (-3)$



Ans.

∴ $-5 + (-3) = -5 - 3$
 $= -8$

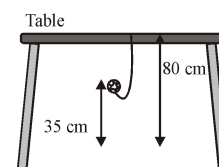
SE. 11

Simplify : $-3 + 7 + (-8)$

Ans. $-3 + 7 + (-8)$
 $= -3 + 7 - 8$
 $= 4 - 8 = -4$

SE. 12

The diagram below show a pendulum tided to a string.



When the pendulum was released from the table, it dropped to a height of 80 cm below the table. It was then pulled 35 cm up. How far is the pendulum from the table now?

Ans. The distance of the pendulum from the table
 $= -80 + 35$
 $= -45$ cm
 \therefore The pendulum is 45 cm below the table.

SE. 13

The temperature of a town is -14°C at night. During the day, the temperature increases by 7°C . What is the temperature of the town during the day?

Ans. The question involves the sum of negative integer and a positive integer.
 $-14^\circ\text{C} + 7^\circ\text{C} = -7^\circ\text{C}$

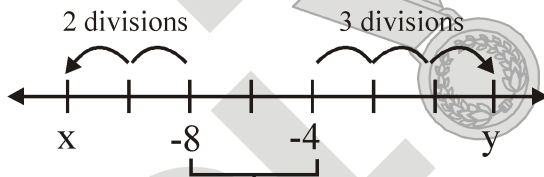
SE. 14

The diagram shows a number line.



Find the value of $x + y$.

Ans. First, find the pattern of the number sequence. Then, find the value of x and y . Add x and y .



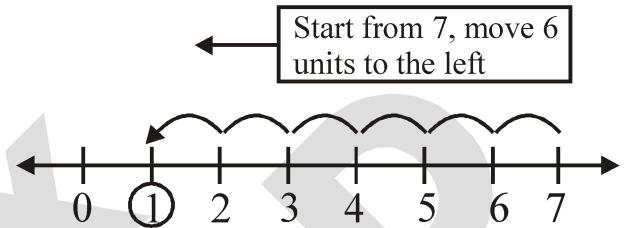
2 divisions $= 4$
 $\therefore 1$ division $= 2$
 $x = -8 + (-4) = -12$ (Two divisions to the left means (-4))
 $y = -4 + 6 = 2$ (Three divisions to the right means $(+6)$)
 $\therefore x + y = -12 + 2$
 $= -10$

SE. 15

Solve the following

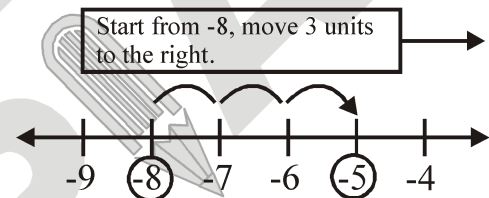
- (A) $7 - (+6)$
- (B) $-8 - (-3)$

Ans. (A)



$\therefore 7 - (+6) = 7 - 6 = 1$

(B) Start from -8 , move 3 units to the right.



$\therefore 8 - (-3) = -8 + 3$
 $= -5$

SE. 16

Simplify : $-8 - (+3) - (-5)$.

Ans. $= -8 - 3 + 5$
 $= -11 + 5$
 $= -6$

SE. 17

A diver was diving 100 m below sea level. He went down 20 m and came up 35 m again. How far below sea level did he dive?

Ans. Initial position $= -100$ m
 Final position $= -100$ m $- 20$ m $+ 35$ m
 $= -100$ m $- 20$ m $+ 35$ m
 $= -85$ m
 \therefore He is 85 m below sea level.

EXERCISE - 6.1

NS. 1

Write opposites of the following :

- (A) Increase in weight (B) 30 km north
 (C) 326 BC (D) Loss of Rs. 700
 (E) 100 m above sea level

- Ans.** (A) Decrease in weight (B) 30 km South
 (C) 326 AD (D) Gain of Rs. 700
 (E) 100 m below sea level

NS. 2

Represent the following numbers as integers with appropriate signs.

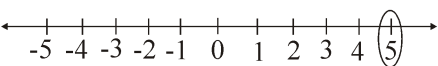
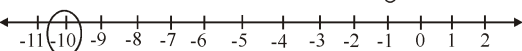
- (A) An aeroplane is flying at a height two thousand metre above the ground.
 (B) A submarine is moving at a depth, eight hundred metre below the sea level.
 (C) A deposit of rupees two hundred.
 (D) Withdrawal of rupees seven hundred.

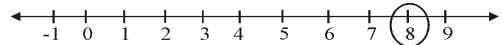
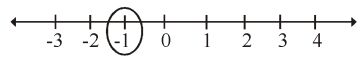
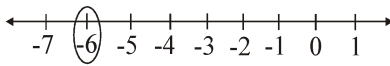
- Ans.** (A) Two thousand metre above the ground = + 2000
 (B) Eight hundred metre below the sea level = - 800
 (C) Deposit of two hundred rupees = + 200
 (D) Withdrawal of seven hundred rupees = - 700

NS. 3

Represent the following numbers on a number line:

- (A) +5 (B) -10
 (C) +8 (D) -1
 (E) -6

- Ans.** (A) 
 (B) 

- (C) 
 (D) 
 (E) 

NS. 4

Adjacent figure is a vertical number line, representing integers. Observe it and locate the following points :

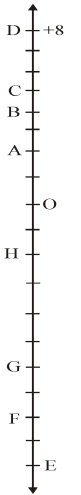
(A) If point D is + 8, then which point is - 8?

(B) Is point G a negative integer or a positive integer ?

(C) Write integers for points B and E.

(D) Which point marked on this number line has the least value ?

(E) Arrange all the points in decreasing order of value



Ans. (A) We have, point D is +8.

Therefore, 16 steps to the down from D is -8 i.e., the point F.

(B) Yes point G is a negative integer.

(C) Point B is four steps down from point D.

\therefore Value of point B = + 8 - 4 = + 4

Point E is eighteen steps down from point D.

\therefore Value of point E = +8 - 18 = -10

(D) Since, point E is located in the bottom. So, point E has the least value.

(E) Decreasing order of all the points is, D, C, B, A, O, H, G, F, E.

NS. 9

For the following statements, write True (T) or False (F). If the statement is false, correct the statement.

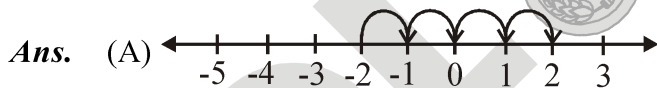
- (A) -8 is to the right of -10 on a number line.
- (B) -100 is to the right of -50 on a number line.
- (C) Smallest negative integer is -1 .
- (D) -26 is greater than -25 .

- Ans.** (A) True
 (B) False : Since -100 is to the left of -50 on the number line.
 (C) False : Since -1 is the greatest negative integer.
 (D) False : Since -26 is less than -25 .

NS. 10

Draw a number line and answer the following :

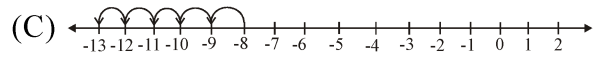
- (A) Which number will we reach if we move 4 numbers to the right of -2 .
- (B) Which number will we reach if we move 5 numbers to the left of 1.
- (C) If we are at -8 on the number line, in which direction should we move to reach -13 ?
- (D) If we are at -6 on the number line, in which direction should we move to reach -1 ?



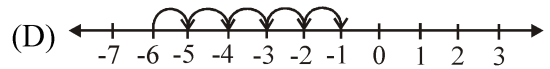
Thus, we will reach 2 if we move 4 numbers to the right of -2 .



Thus, we will reach -4 if we move 5 numbers to the left of 1.



Thus, we should move 5 numbers to the left -8 to reach -13 .



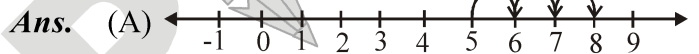
Thus, we should move 5 numbers to the right of -6 to reach -1 .

EXERCISE - 6.2

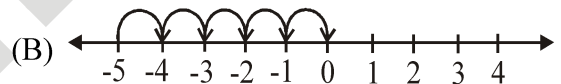
NS. 1

Using the number line write the integer which is :

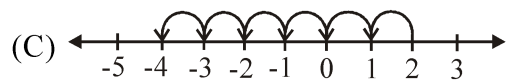
- (A) 3 more than 5
- (B) 5 more than -5
- (C) 6 less than 2
- (D) 3 less than -2



Thus, 3 more than 5 is 8.



Thus, 5 more than -5 is 0.



Thus, 6 less than 2 is -4 .

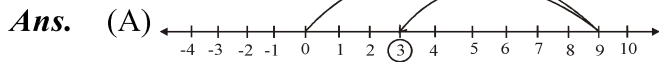


Thus, 3 less than -2 is -5 .

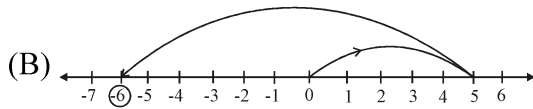
NS. 2

Use number line and add the following integers :

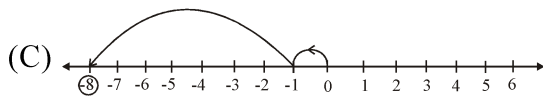
- (A) $9 + (-6)$
- (B) $5 + (-11)$
- (C) $(-1) + (-7)$
- (D) $(-5) + 10$
- (E) $(-1) + (-2) + (-3)$
- (F) $(-2) + 8 + (-4)$



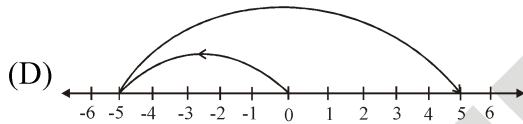
Thus, $9 + (-6) = 3$



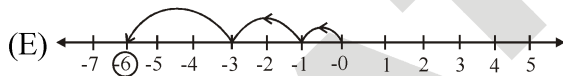
Thus, $5 + (-11) = -6$



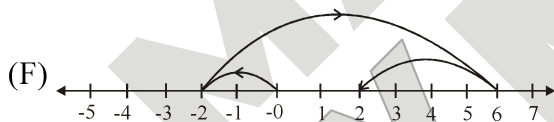
Thus, $(-1) + (-7) = -8$



Thus, $(-5) + 10 = 5$



Thus, $(-1) + (-2) + (-3) = -6$



Thus, $(-2) + 8 + (-4) = 2$

NS. 3

Add without using number line :

- (A) $11 + (-7)$ (B) $(-13) + (+18)$
 (C) $(-10) + (+19)$ (D) $(-250) + (+150)$
 (E) $(-380) + (-270)$ (F) $(-217) + (-100)$

Ans. (A) $11 + (-7) = 11 - 7 = 4$

(B) $(-13) + (+18) = -13 + 18 = 5$

(C) $(-10) + (+19) = -10 + 19 = 9$

(D) $(-250) + (+150) = -250 + 150 = -100$

(E) $(-380) + (-270) = -380 - 270 = -650$

(F) $(-217) + (-100) = -217 - 100 = -317$

NS. 4

Find the sum of :

- (A) 137 and -354 (B) -52 and 52
 (C) -312, 39 and 192 (D) -50, -200 and 300

Ans. (A) $137 + (-354) = 137 - 354 = -217$

(B) $-52 + 52 = 0$

(C) $-312 + 39 + 192 = -312 + 231 = -81$

(D) $-50 + (-200) + 300 = -50 - 200 + 300 = -250 + 300 = 50$

NS. 5

Find the sum :

- (A) $(-7) + (-9) + 4 + 16$
 (B) $(37) + (-2) + (-65) + (-8)$

Ans. (A) $(-7) + (-9) + 4 + 16 = -7 - 9 + 4 + 16 = -16 + 20 = 4$

(B) $(37) + (-2) + (-65) + (-8) = 37 - 2 - 65 - 8 = 37 - 75 = -38$

EXERCISE - 6.3

NS. 1

Find

- (A) $35 - (20)$ (B) $72 - (90)$
 (C) $(-15) - (-18)$ (D) $(-20) - (13)$
 (E) $23 - (-12)$ (F) $(-32) - (-40)$

- Ans.** (A) $35 - 20 = 15$
 (B) $72 - 90 = -18$
 (C) $(-15) - (-18) = -15 + 18 = 3$
 (D) $(-20) - (13) = -20 - 13 = -33$
 (E) $23 - (-12) = 23 + 12 = 35$
 (F) $(-32) - (-40) = -32 + 40 = 8$

NS. 2

Fill in the blanks with $>$, $<$ or $=$ sign.

- (A) $(-3) + (-6)$ _____ $(-3) - (-6)$
 (B) $(-21) - (-10)$ _____ $(-31) + (-11)$
 (C) $45 - (-11)$ _____ $57 + (-4)$
 (D) $(-25) - (-42)$ _____ $(-42) - (-25)$

- Ans.** (A) $<$: $(-3) + (-6) = -3 - 6 = -9$
 $\therefore (-3) - (-6) = -3 - 6 = -9$
 Since, $-9 < -9$
 $\therefore (-3) + (-6) < (-3) - (-6)$
 (B) $>$: $(-21) - (-10) = -21 + 10 = -11$
 $(-31) + (-11) = -31 - 11 = -42$

Since, $-11 > -42$

$\therefore (-21) - (-10) > (-31) + (-11)$

(C) $>$: $45 - (-11) = 45 + 11 = 56$

$57 + (-4) = 57 - 4 = 53$

Since, $56 > 53$

$\therefore 45 - (-11) > 57 + (-4)$

(D) $>$: $(-25) - (-42) = -25 + 42 = 17$

$(-42) - (-25) = -42 + 25 = -17$

Since, $17 > -17$

$\therefore (-25) - (-42) > (-42) - (-25)$

NS. 3





Fill in the blanks.

- (A) $(-8) +$ _____ $= 0$
 (B) $13 +$ _____ $= 0$
 (C) $12 + (-12) =$ _____
 (D) $(-4) +$ _____ $= -12$
 (E) _____ $- 15 = -10$

- Ans.** (A) 8 : $(-8) + 8 = 0$
 (B) -13 : $13 + (-13) = 0$
 (C) 0 : $12 + (-12) = 0$
 (D) -8 : $(-4) + (-8) = -12$
 (E) 5 : $5 - 15 = -10$

EXERCISE – I

ONLY ONE CORRECT TYPE

1. A whale swimming on the water's surface dives 250m. It then dives another 75 m. Which expression represents this situation ?
 (A) $-75 + 250$ (B) $-250 + (-75)$
 (C) $-250 + 75$ (D) $250 + 75$
2. Which set of integers is written in ascending order ?
 (A) 113, -200, 153, 84
 (B) -46, -68, -101, 260
 (C) 54, 80, -125, 150
 (D) -361, -316, -163, -136
3. Which situation could be best represented by -60 ?
 (A) Height of 60 m above the ground
 (B) Profit of Rs. 60 in a bank
 (C) Lost by 60 goals
 (D) A time after 60 years
4. The value of $100 + (-75) + (-89) + (69)$ is _____.
 (A) 169 (B) 5
 (C) 164 (D) -5
5. When we add two negative integers, we always get _____.
 (A) positive integer
 (B) negative integer
 (C) -1
 (D) 0
6. Which expression has a value greater than -3 ?
 (A) $4 + (-9)$
 (B) $3 + (-8) + 1$
 (C) $-10 + 8$
 (D) $-1 + (-5) + 2$
7. Which of the following number line represents $(-5) + 8$?
 (A) 
 (B) 
 (C) 
 (D) 
8. What is the value of $116 - 61 - 33 + (-12)$?
 (A) 10 (B) 15
 (C) -25 (D) -15
9. Which of the following represents negative integer ?
 (A) 25°C above freezing point
 (B) 2 km below sea - level
 (C) A deposit of Rs. 2589
 (D) Gain of Rs. 1987
10. The point A is on a mountain which is 5700 metres above sea-level and the point B is in a mine which is 39600 metres below sea-level.
 Find the vertical distance between A and B.
 (A) 33900 m (B) 45300 m
 (C) 17400 m (D) 43600 m
11. Which of the following statements is not true ?
 (A) $5128 - (-2459) > (-687) - (-1040)$
 (B) $-584 - (347) < 960 - (728)$
 (C) $6250 + (-3012) > 6240 - (-271)$
 (D) $-888 + (3002) > 1001 - (-13)$
12. The additive inverse of the sum of the integers -9853 and -3187 is _____.
 (A) 6666 (B) 4031
 (C) 10340 (D) 13040

13. Which of the following represents the given number line ?



- (A) $4 + (-6)$ (B) $4 - (-6)$
 (C) $-2 + (6)$ (D) $(-2) - (-6)$
14. The successor of $498 + (-1015)$ is _____.
 (A) -517 (B) -516
 (C) 516 (D) 517
15. Which of the following is greatest ?
 (A) -986 (B) -347
 (C) -425 (D) -1058
16. The sum of two integers is 345. If one of them is -239 , then the other is _____.
 (A) 584 (B) 522
 (C) -548 (D) -522
17. Which sum is not negative?
 (A) $-38 + (-24)$ (B) $-61 + 43$
 (C) $-53 + 72$ (D) $-25 + 0$
18. Find an integer 'P' such that $P + (-9) = 0$.
 (A) 8 (B) 0
 (C) 9 (D) -9
19. If we move 8 steps to the left of 1 on the number line, where will we reach ?
 (A) 9 (B) -8
 (C) 6 (D) -7
20. Which of the following are arranged in descending order ?
 (A) $-428, -386, -213, 428, 936$
 (B) $-881, -954, -927, -1018, -3261$
 (C) $428, -628, -936, -1059, -2361$
 (D) none of these

21. Piyush travelled 298 km north and Amit travelled 890 km south from the same point. Find the distance between the final destination of the two.
 (A) 1190 m
 (B) 600 m
 (C) 1188 m
 (D) 592 m
22. For any two integers p and q, $p + q = q + p$. This property is known as _____.
 (A) Associative
 (B) Commutative
 (C) Closure
 (D) Additive identity
23. On the number line, -50 lies to the _____.
 (A) Left of -60
 (B) Right of 50
 (C) Right of -60
 (D) Right of 0
24. Add (-345) and 428 and then subtract 960 from the result. The answer will be _____.
 (A) -877
 (B) 877
 (C) -536
 (D) 536
25. When we add a positive integer and a negative integer, then the resultant sign will be _____.
 (A) Always negative
 (B) Always positive
 (C) Sign of bigger numerical value
 (D) Sign of smaller integer

PARAGRAPH TYPE

PASSAGE # 1

During a week in the month of December, Shimla recorded the following temperatures :

-3°C , -6°C , 2°C , 1°C , -4°C , 0°C and 9°C .

26. The difference between the highest and lowest temperature during the week was
 (A) 11°C (B) 15°C
 (C) 13°C (D) 10°C
27. The freezing point is
 (A) 100°C (B) 10°C
 (C) 0°C (D) -100°C
28. The ascending order of the given temperatures is
 (A) -3°C , -6°C , 2°C , -1°C , -4°C , 0°C , 9°C
 (B) 9°C , 2°C , 1°C , 0°C , -3°C , -4°C , -6°C
 (C) -6°C , -4°C , -3°C , 0°C , 1°C , 2°C , 9°C
 (D) None of these

PASSAGE # 2

If Δ is an operation on integers such that for integers a and b ,

$$a \Delta b = a - b - (-2)$$

Find the value of

29. $2 \Delta 3$
 (A) 1 (B) 2
 (C) 3 (D) 4
30. $(-3) \Delta (-4)$
 (A) 3 (B) 4
 (C) 5 (D) 6
31. $3 \Delta (-5)$
 (A) 10 (B) 11
 (C) 12 (D) 13

MATCH THE COLUMN

In this section each question has two matching lists. Choices for the correct combination of elements from Column I and Column II are given as options (A), (B), (C) and (D) out of which one is correct.

32. Match the statements given in Column – I which can be represented by the integers given in Column – II.

Column I

Column II

- (P) An increase of 50 points (i) -20
 (Q) A temperature drop by 20°C (ii) $+50,000$
 (R) 50 minutes before flight time (iii) -50
 (S) Increase in population by 50,000 (iv) $+50$

- (A) $P \rightarrow \text{iii}$, $Q \rightarrow \text{iv}$, $R \rightarrow \text{i}$, $S \rightarrow \text{ii}$
 (B) $P \rightarrow \text{i}$, $Q \rightarrow \text{ii}$, $R \rightarrow \text{iii}$, $S \rightarrow \text{iv}$
 (C) $P \rightarrow \text{iii}$, $Q \rightarrow \text{i}$, $R \rightarrow \text{iv}$, $S \rightarrow \text{ii}$
 (D) $P \rightarrow \text{iv}$, $Q \rightarrow \text{i}$, $R \rightarrow \text{iii}$, $S \rightarrow \text{ii}$

33. Match the following :

Column I

Column II

- (P) $(-516) + \{(-327) - (-925)\} =$ (i) -10000
 (Q) $-45632 - (-35632) =$ (ii) -42
 (R) $\{-380 - (675)\} - \{865 + (-493)\}$ (iii) 82
 (S) $\{-340 - (-170)\} - \{-(45) - 83\}$ (iv) -1427

- (A) $P \rightarrow \text{i}$, $Q \rightarrow \text{iii}$, $R \rightarrow \text{iv}$, $S \rightarrow \text{ii}$
 (B) $P \rightarrow \text{iii}$, $Q \rightarrow \text{i}$, $R \rightarrow \text{ii}$, $S \rightarrow \text{iv}$
 (C) $P \rightarrow \text{ii}$, $Q \rightarrow \text{i}$, $R \rightarrow \text{iv}$, $S \rightarrow \text{iii}$
 (D) $P \rightarrow \text{iii}$, $Q \rightarrow \text{i}$, $R \rightarrow \text{iv}$, $S \rightarrow \text{ii}$

EXERCISE – II

VERY SHORT ANSWER TYPE

- Which integer represents the opposite of “depositing Rs. 1,50,000 ?”
- Which number will we reach if we move three steps to the right of -118 ?
- In which direction and how many steps should we move from -14 to reach -7 ?
- Add the successor and predecessor of -129 .
- Write five negative integers less than -120 .
- Define additive inverse.
- Which is smaller $-215 + (-318)$ or $-425 - (-712)$?
- Find the value of $(-45) + (-387) - (425) + 115$.
- If $a = -215$, $b = -816$ and $c = 312$, then verify associative law of addition.
- On subtracting -895 from the sum of 436 and (-15) , which number will we get ?

SHORT ANSWER TYPE

- On a particular day, the temperature at Nainital in the morning was 20°C but by midnight, it fell down to 11°C . The temperature at Delhi in the morning on the same day was 40°C but fell down 12°C by the midnight. Which fall is greater ?
- Using the number line, write the following integers.
 - -9 less than -5
 - -4 more than 3
- On the number line which numbers lie between -6 and -2 and which is the greatest number and the smallest number among them ?

- Find the sum :

(i) $1393 + (-407) + (-872) + 690$
 (ii) $703 + (-3) + (-1) + 1 + (-400) + 0$

- Evaluate :

(i) $|-7| \times |-2|$ (ii) $|17| - |-15|$
 (iii) $|7-3| \times |5-5|$

LONG ANSWER TYPE

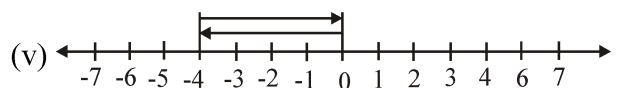
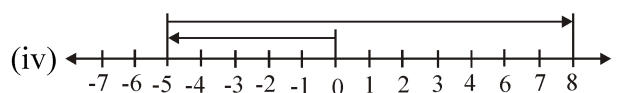
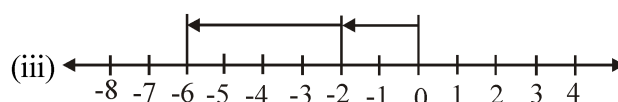
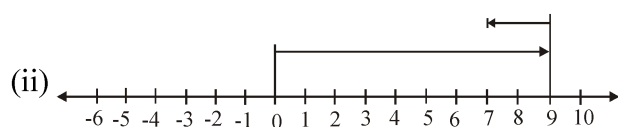
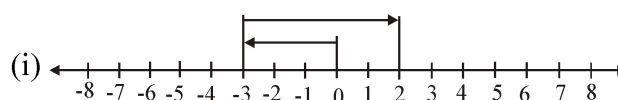
- Given below is a number line representing integers. Mark and write the integers corresponding to the following points.



- (i) A (ii) B
 (iii) D (iv) F
 (v) G (vi) H

Which of the following points represent a pair of opposites ?

- Write the addition sentence shown by the following number lines.



3. Find the value of

(i) $65 + (-10) + (-95) + 50$

(ii) $(-12) + (-6) + (-3) - (-13)$

Plot the value of each part on the number line and also tell the additive inverse.

4. The second tallest peak in the world K2 (Godwin Austen) along the Pakistan/China border is 28,250 feet (approx. 8,611 metres) above mean sea-level. The lowest points in all the oceans on earth is in the Dead Sea at - 1312 feet (approx. -400 metres) below mean sea-level. What is the difference between these two points in feet as well as in metres ?

5. Find the value of the following.

(i) $412 + (-98) + (-84) + (-7) + 35$

(ii) $-21 + (-9) + 63 + (-22) + (-228) + 137$

(iii) $-12 + (-98) - (-84) + (-7)$

(iv) $-12 - [(-15) + (-2) + (-2) + (-3)]$

FILL IN THE BLANKS

- The number which is 461 less than -482 is _____.
- _____ is smaller than every positive integer as well as a whole number.
- The successor of -508 is _____.
- The value of $-2319 + (-512) - (-2805)$ is _____.
- _____ is greater than every negative integer but less than every positive integer.

TRUE / FALSE TYPE

- 20 is to the right of -15 on the number line.
- 411, -813, -915, -975 are arranged in ascending order.
- While comparing two negative integers, the one with the smaller absolute value is greater.
- The expression $-982 + (-111)$ and $-111 + (-982)$ has the same value.
- When two positive integers are added, we get a negative integer.

NUMERICAL PROBLEMS

In this section, each question, when worked out will result in one integer from 0 to 9 (both inclusive).

- What is the additive inverse of -4 ?
- What is the value of $\{(-289) + 290\} - (315) - (-314)$?
- What is the sum of 720 and its additive inverse ?
- How much is -25 less than -16 ?
- What is the successor of $12 + (-11)$?

Answer Key

EXERCISE-I

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
B	D	C	B	B	C	D	A	B	B	C	D	A	B	B
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
A	C	C	D	C	C	B	C	A	C	B	C	C	A	A
31	32	33												
A	D	D												

EXERCISE – II

VERY SHORT ANSWER TYPE

1. -1,50,000 2. -115 3. Right direction and 7 steps 4. -258
 6. $x + (-x) = 0$ 7. $-215 + (-318)$ 8. -742 9. -719 10. 1316

SHORT ANSWER TYPE

1. Delhi
 2. (i)4 (ii)-1
 3. -5, -4, -3, and greatest number is -3 and smallest number is -5.
 4. (i) 804 (ii)300
 5. (i) 14(ii)2 (iii)0

LONG ANSWER TYPE

1. (i) $A = -3$ (ii) $B = 3$ (iii) $D = -5$ (iv) $F = 2$ (v) $G = 5$ (vi) $H = 0$; A and B, D and G
 2. (i) 2 (ii) 7 (iii) -6 (iv) 8 (v) 0
 3. (i)10; additive inverse is -10 (ii) -8; additive inverse is 8.
 4. 9011m
 5. (i) 258 (ii) -80 (iii) -33 (iv) 10

FILL IN THE BLANKS

1. -943 2. 0 3. -507 4. -26 5. 0

TRUE / FALSE

1. F 2. F 3. T 4. T 5. F

NUMERICAL PROBLEMS

1. 4 2. 0 3. 0 4. 9 5. 2

SELF PROGRESS ASSESSMENT FRAMEWORK

(CHAPTER : INTEGERS)

CONTENT	STATUS	DATE OF COMPLETION	SELF SIGNATURE
Theory			
In-Text Examples			
Solved Examples			
NCERT Exercises			
Exercise I			
Exercise II			
Short Note-1			
Revision - 1			
Revision - 2			
Revision - 3			
Remark			

NOTES :

1. In the status, put “completed” only when you have thoroughly worked through this particular section.
2. Always remember to put down the date of completion correctly. It will help you in future at the time of revision.



Space for Notes :

A large rectangular area containing 25 horizontal dotted lines, intended for writing notes.



FRACTIONS

2

Concepts

Introduction

1. *Fractions*
2. *Like and unlike fraction*
 - 2.1 *Like Fractions*
 - 2.2 *Unlike Fractions*
 - 2.3 *To convert unlike fractions into like fractions*
 - 2.4 *Mixed fractions*
3. *Changing mixed fractions into improper fractions*
4. *Changing improper fractions into mixed numbers*
5. *Equivalent fractions*
 - 5.1 *Finding equivalent fractions*
 - 5.2 *Determining equivalent fractions*

Solved Examples

NCERT Solutions

Exercise - I (SCQ Type)

Exercise - II (Board Pattern Type)

Answer Key

1. FRACTIONS

A fraction is a number of the form $\frac{a}{b}$, where a and b are integers and $b \neq 0$. The parts of a fraction are

numerator $\rightarrow a$
 denominator $\rightarrow b$ ← fraction bar .

Example 1

What fraction of a day is 15 hours ?

Solution :

Number of hours in 1 day = 24

$$\therefore \text{Required fraction} = \frac{15}{24}$$

2. LIKE AND UNLIKE FRACTION

2.1 LIKE FRACTIONS

Fractions having same denominator are called like fractions.

Ex. $\frac{2}{9}, \frac{4}{9}, \frac{5}{9}$ and $\frac{8}{9}$ are all like fractions

2.2 UNLIKE FRACTIONS

Fraction with different denominators are called unlike fractions

Ex. $\frac{1}{2}, \frac{3}{4}, \frac{5}{6}$ and are all unlike fractions.

2.3 TO CONVERT UNLIKE FRACTIONS INTO LIKE FRACTIONS

Note: Suppose some unlike fractions are given. Convert each one of them into an equivalent fraction having a denominator equal to the LCM of all the denominators of the given fractions.

Proper fractions: A fraction is called a proper fraction if the numerator is less than the denominator.

Ex. $\frac{1}{2}, \frac{3}{8}, \frac{5}{6}$ and $\frac{99}{105}$

Improper fractions: A fraction is called an improper fraction if the numerator is greater than or equal to the denominator.

Ex. $\frac{5}{2}, \frac{3}{3}, \frac{13}{8}$ and $\frac{52}{21}$

2.4 MIXED FRACTIONS

Writing and representing mixed fractions.

1. A mixed fraction consists of a whole number and a fraction part.

Ex. $3\frac{1}{3}$, $4\frac{2}{5}$, $13\frac{5}{6}$ and $154\frac{7}{9}$

2. A mixed fraction can be represented by a diagram.

3. If a diagram is given, the number of shaded parts can be expressed as a mixed fraction.

4. A number line can be used to arrange the mixed fractions in order.

3. CHANGING MIXED FRACTIONS INTO IMPROPER FRACTIONS

How do we change mixed fractions into improper fractions ?

Step 1: Retain the denominator.

Step 2: Multiply the whole number with the denominator.

Step 3: Add the product of the denominator and whole number to the numerator.

Example 2

Convert the following into improper fractions.

(i) $3\frac{9}{11}$

(ii) $19\frac{4}{7}$

Solution :

(i) $3\frac{9}{11} = \frac{3 \times 11 + 9}{11} = \frac{42}{11}$

(ii) $19\frac{4}{7} = \frac{19 \times 7 + 4}{7} = \frac{137}{7}$

4. CHANGING IMPROPER FRACTIONS INTO MIXED NUMBERS

How do we change an improper fraction into a mixed number ?

Step 1: Divide the numerator with the denominator.

Step 2: Retain the denominator.

Step 3: The quotient becomes the whole number.

Step 4: The remainder becomes the numerator.

Example 3

Convert the following into mixed fraction.

(i) $\frac{14}{3}$ (ii) $\frac{93}{5}$

Solution :

(i) If we divide 14 by 3, we get Q = 4, R = 2, D = 3

∴ Mixed fraction of $\frac{14}{3} = 4\frac{2}{3}$

(ii) If we divide 93 by 5, we get Q = 18, R = 3, D = 5



Focus Point

- Mixed fraction = Whole number $\frac{\text{Number}}{\text{Denominator}}$
- Improper fraction = $\frac{(\text{Whole Number} \times \text{Denominator}) + \text{Numerator}}{\text{Denominator}}$
- Mixed fraction = Quotient $\frac{\text{Remainder}}{\text{Divisor}} \left(Q \frac{R}{D} \right)$

5. EQUIVALENT FRACTIONS

Two or more fractions having the same value or representing the same part of whole are called equivalent fractions.

5.1 FINDING EQUIVALENT FRACTIONS

Equivalent fractions are fractions that represent the same value although they have different numerators and denominators.

Ex. $\frac{1}{2} = \frac{2}{4} = \frac{3}{6} = \dots$

To find the equivalent fractions for a given fraction:

Multiply or divide both the numerator and denominator by the same number.

5.2 DETERMINING EQUIVALENT FRACTIONS

To determine whether two given fractions are equivalent or not :

Change both fractions into fractions with the same (common) denominator, then compare the numerators.

If the numerators are the same, then these two fractions are equivalent.

If the numerators are different, then these two fractions are not equivalent.

Comparing the values of two fractions

(A) If fractions have a common denominator :

Compare the value of the numerators. The fractions with the larger numerator has the larger value.

Ex. $\frac{2}{5}$ and $\frac{4}{5}$

$\therefore \frac{4}{5} > \frac{2}{5}$ (Compare the numerators. $4 > 2$)

(B) If both fractions have different numerator and denominators :

Change both the fractions into their respective equivalent fractions with the same denominator; that is, by finding the LCM for both the denominators.

Then compare the numerators to determine the fraction that is greater or smaller.

Ex. $\frac{3}{5}$ and $\frac{1}{4}$, which is greater ?

The LCM of 5 and 4 is 20.

$$\frac{3}{5} = \frac{3}{5} \times \frac{4}{4} = \frac{12}{20}$$

$$\frac{1}{4} = \frac{1}{4} \times \frac{5}{5} = \frac{5}{20}$$

Since $\frac{12}{20} > \frac{5}{20}$, therefore $\frac{3}{5} > \frac{1}{4}$.



BUILD THE CONCEPT

- Fraction is a part of a whole.
- When numerator of a fraction is lesser than the denominator, it is called proper fraction.
- When numerator of a fraction is greater than or equal to the denominator, it is called improper fraction.
- If numerator and denominator have no common factor other than 1, then fraction is in simplest form.
- Combination of a whole number and a proper fraction is called mixed fraction.
- Two or more fractions are said to be equivalent if their simplest forms are same.
- Like fractions have same denominators.
- Unlike fractions have different denominators.

SOLVED EXAMPLES

SE. 1

Arrange $\frac{2}{5}$, $\frac{3}{4}$ and $\frac{1}{3}$ in descending order.

Ans. The L.C.M. for the denominators 5, 4 and 3 is 60.

Convert each fraction into fraction with denominator 60.

$$\frac{2}{5} = \frac{2 \times 12}{5 \times 12} = \frac{24}{60}; \frac{3}{4} = \frac{3}{4} \times \frac{15}{15} = \frac{45}{60}; \frac{1}{3} = \frac{1 \times 20}{3 \times 20} = \frac{20}{60}$$

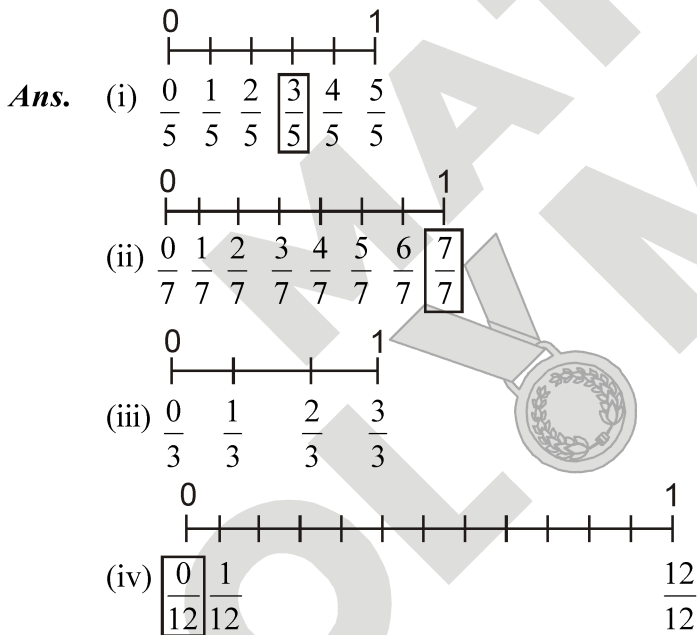
Comparing the numerators: $45 > 24 > 20$.

$$\therefore \frac{3}{4} > \frac{2}{5} > \frac{1}{3}$$

SE. 2

Show : (i) $\frac{3}{5}$ (ii) $\frac{7}{7}$ (iii) $\frac{2}{3}$ (iv) $\frac{0}{12}$ on a

number line.



SE. 3

Change the following group of fractions into like fractions :

(i) $\frac{2}{7}, \frac{7}{8}, \frac{5}{14}, \frac{9}{16}$ (ii) $\frac{4}{5}, \frac{7}{6}, \frac{6}{7}, \frac{9}{10}$

Ans. (i) We have, $\frac{2}{7}, \frac{7}{8}, \frac{5}{14}, \frac{9}{16}$

$$\text{LCM}(7, 8, 14, 16) = 112$$

Converting fractions into like fractions

$$\therefore \frac{2}{7} = \frac{2 \times 16}{7 \times 16} = \frac{32}{112}; \frac{7}{8} = \frac{7 \times 14}{8 \times 14} = \frac{98}{112}$$

$$\frac{5}{14} = \frac{5 \times 8}{14 \times 8} = \frac{40}{112}; \frac{9}{16} = \frac{9 \times 7}{16 \times 7} = \frac{63}{112}$$

(ii) We have, $\frac{4}{5}, \frac{7}{6}, \frac{6}{7}, \frac{9}{10}$

$$\text{LCM}(5, 6, 7, 10) = 210$$

Converting fractions into like fractions

$$\therefore \frac{4}{5} = \frac{4 \times 42}{5 \times 42} = \frac{168}{210}; \frac{7}{6} = \frac{7 \times 35}{6 \times 35} = \frac{245}{210}$$

$$\frac{6}{7} = \frac{6 \times 30}{7 \times 30} = \frac{180}{210}; \frac{9}{10} = \frac{9 \times 21}{10 \times 21} = \frac{189}{210}$$

SE. 4

Check whether the following are equivalent fractions or not.

(i) $\frac{3}{10}$ and $\frac{15}{50}$

(ii) $\frac{6}{9}$ and $\frac{11}{18}$

Ans. (i) Cross multiply : $\frac{3}{10} \times \frac{15}{50}$

The cross products are $3 \times 50 = 150$ and $10 \times 15 = 150$

As the cross products are equal so the two given fractions are equivalent fractions.

(ii) Cross multiply : $\frac{6}{9} \times \frac{11}{18}$

The cross products are $6 \times 18 = 108$ and $9 \times 11 = 99$

As the cross products are not equal so the two given fractions are not equivalent fractions.

SE. 5

Arrange the following fractions in ascending order of their values :

(i) $\frac{2}{3}, \frac{5}{9}, \frac{5}{6}, \frac{3}{8}$ (ii) $\frac{2}{5}, \frac{3}{10}, \frac{7}{15}$

Ans. (i) we have, $\frac{2}{3}, \frac{5}{9}, \frac{5}{6}, \frac{3}{8}$

LCM (3, 9, 6, 8) = 72

Converting fractions into like fractions

$$\therefore \frac{2}{3} = \frac{2 \times 24}{3 \times 24} = \frac{48}{72}, \frac{5}{9} = \frac{5 \times 8}{9 \times 8} = \frac{40}{72}$$

$$\frac{5}{6} = \frac{5 \times 12}{6 \times 12} = \frac{60}{72}, \frac{3}{8} = \frac{3 \times 9}{8 \times 9} = \frac{27}{72}$$

$$\therefore \frac{27}{72} < \frac{40}{72} < \frac{48}{72} < \frac{60}{72} \text{ or, } \frac{3}{8} < \frac{5}{9} < \frac{2}{3} < \frac{5}{6}$$

(ii) We have, $\frac{2}{5}, \frac{3}{10}, \frac{7}{15}$

LCM (5, 10, 15) = 30

Converting fractions into like fractions

$$\therefore \frac{2}{5} = \frac{2 \times 6}{5 \times 6} = \frac{12}{30}; \frac{3}{10} = \frac{3 \times 3}{10 \times 3} = \frac{9}{30}$$

$$\frac{7}{15} = \frac{7 \times 2}{15 \times 2} = \frac{14}{30}$$

$$\therefore \frac{9}{30} < \frac{12}{30} < \frac{14}{30} \text{ or } \frac{3}{10} < \frac{2}{5} < \frac{7}{15}$$

SE. 6

Simplify : (i) $\frac{79}{12} - 2\frac{5}{6} - 1\frac{1}{4}$

(ii) $\frac{5}{36} - \frac{7}{12} + 7\frac{1}{24} - 3\frac{5}{48}$

Ans. (i) $\frac{79}{12} - 2\frac{5}{6} - 1\frac{1}{4} = \frac{79}{12} - \frac{17}{6} - \frac{5}{4}$

$$= \frac{79 \times (12 \div 12) - 17 \times (12 \div 6) - 5 \times (12 \div 4)}{12}$$

(LCM of 12, 6, 4 = 12)

$$= \frac{79 \times 1 - 17 \times 2 - 5 \times 3}{12} = \frac{79 - 34 - 15}{12}$$

$$= \frac{79 - 49}{12} = \frac{30}{12} = \frac{30 \div 6}{12 \div 6} = \frac{5}{2} = 2\frac{1}{2}$$

(ii) $\frac{5}{36} - \frac{7}{12} + 7\frac{1}{24} - 3\frac{5}{48} = \frac{5}{36} - \frac{7}{12} + \frac{169}{24} - \frac{149}{48}$
(LCM of 36, 12, 24, 48 = 144)

$$= \frac{5 \times (144 \div 36) - 7 \times (144 \div 12) + 169 \times (144 \div 24) - 149 \times (144 \div 48)}{144}$$

$$= \frac{5 \times 4 - 7 \times 12 + 169 \times 6 - 149 \times 3}{144}$$

$$= \frac{20 - 84 + 1014 - 447}{144}$$

$$= \frac{1034 - 531}{144} = \frac{503}{144} = 3\frac{71}{144}$$

SE. 7

Simplify : $2\frac{3}{5} + 1\frac{3}{10} - 3\frac{2}{15}$

Ans. Converting to improper fractions, we have

$$\frac{13}{5} + \frac{13}{10} - \frac{47}{15}$$

LCM (5, 10, 15) = 30

$$\therefore \frac{13}{5} + \frac{13}{10} - \frac{47}{15} = \frac{13 \times 6 + 13 \times 3 - 47 \times 2}{30}$$

$$= \frac{78 + 39 - 94}{30} + \frac{117 - 94}{30} = \frac{23}{30}$$

SE. 8

Compare the following.

(i) $\frac{8}{11}$ and $\frac{8}{13}$

(ii) $\frac{9}{17}$ and $\frac{9}{37}$

Ans. (i) $\frac{8}{11} > \frac{8}{13}$ (because $11 < 13$)

(ii) $\frac{9}{17} > \frac{9}{37}$ (because $17 < 37$)

SE. 9

Find :

(i) $\frac{1}{7}$ of 49 minutes (ii) $\frac{1}{20}$ of 1000 ml

(iii) $\frac{1}{6}$ of 30 hours (iv) $\frac{1}{8}$ of 168 m

Ans. (i) We have, $\frac{1}{7}$ of 49 minutes

$$= \frac{1}{7} \times 49 = 7 \text{ minutes}$$

(ii) We have, $\frac{1}{20}$ of 1000 ml

$$= \frac{1}{20} \times 1000 = 50 \text{ ml}$$

(iii) We have, $\frac{1}{6}$ of 30 hours

$$= \frac{1}{6} \times 30 = 5 \text{ hours}$$

(iv) We have, $\frac{1}{8}$ of 168 m

$$= \frac{1}{8} \times 168 = 21 \text{ m.}$$

SE. 10

Fill in the missing numbers :

(i) $\frac{3}{5} = \frac{?}{20}$

(ii) $\frac{3}{8} = \frac{9}{?}$

Ans. (i) Let $\frac{3}{5} = \frac{x}{20}$

Cross multiply, $\frac{3}{5} \times \frac{x}{20}$

The cross products are, $3 \times 20 = x \times 5$

$$\Rightarrow x \times 5 = 3 \times 20$$

$$\Rightarrow x = \frac{3 \times 20}{5} = 12$$

(ii) Let $\frac{3}{8} = \frac{9}{y}$

Cross multiply, $\frac{3}{8} \times \frac{9}{y}$

The cross products are, $3 \times y = 9 \times 8$

$$\Rightarrow y = \frac{9 \times 8}{3} = 24$$

SE. 11

Manu weights $78\frac{3}{4}$ kg. Tanu weights $68\frac{7}{16}$ kg. who weights more and by how much?

Ans. Weight of Manu = $78\frac{3}{4}$ kg = $\frac{315}{4}$ kg

Weight of Tanu = $68\frac{7}{16}$ kg = $\frac{1095}{16}$ kg

LCM (4, 16) = 16

Converting into like fractions, we have

$$\frac{315}{4} = \frac{315 \times 4}{4 \times 4} = \frac{1260}{16}$$

$$\frac{1095}{16} = \frac{1095 \times 1}{16 \times 1} = \frac{1095}{16}$$

As $\frac{1260}{16} > \frac{1095}{16}$

\therefore Weight of Manu is more than weight of Tanu

$$\text{by} = \frac{1260}{16} - \frac{1095}{16} = \frac{1260 - 1095}{16}$$

$$= \frac{165}{16} \text{ kg or } 10\frac{5}{16} \text{ kg}$$

SE. 12

A flight from Dehradun stops at New Delhi and then continues to Jaipur. The flight time from Dehradun to New Delhi is about $\frac{3}{5}$ hour and the flight time from new Delhi to Jaipur is about $\frac{4}{5}$ hour. Find the total time.

Ans. Flight time from Dehradun to New Delhi
 $= \frac{3}{5}$ hour

Flight time from New Delhi to Jaipur $= \frac{4}{5}$ hour

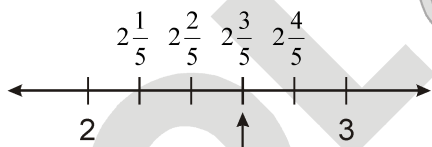
Total time $= \frac{3}{5}$ hour $+ \frac{4}{5}$ hour
 $= \frac{3+4}{5} = \frac{7}{5}$ hours.

SE. 13

Represent $\frac{13}{5}$ on the number line.

Ans. $\frac{13}{5}$ can be written as $2\frac{3}{5}$.

Let us divide the line segment on the number line between 2 and 3 in 5 equal parts.



Thus the point shown on the number line represents $2\frac{3}{5}$ or $\frac{13}{5}$.

SE. 14

In a survey, 80 students were asked to vote for their favourite subject from English, Science and Maths. $\frac{1}{5}$ voted for English, $\frac{1}{4}$ voted for Science and the rest voted for Maths. How many more votes did Maths receive than English?

Ans. Students voted for English $= \frac{1}{5} \times 80 = 16$

Students voted for Science $= \frac{1}{4} \times 80 = 20$

Students voted for Maths $= 80 - (16 + 20)$
 $= 80 - 36 = 44$

Maths received $(44 - 16) = 28$ votes more than English.

SE. 15

Ramesh takes $10\frac{2}{5}$ minutes to walk across the park. Rajesh takes $43\frac{1}{5}$ minutes. Who takes less time and by how much?

Ans. Time taken by Ramesh $= 10\frac{2}{5}$ minutes

$= \frac{52}{5}$ minutes

Time taken by Rajesh $= 43\frac{1}{5}$ minutes

$= \frac{216}{5}$ minutes

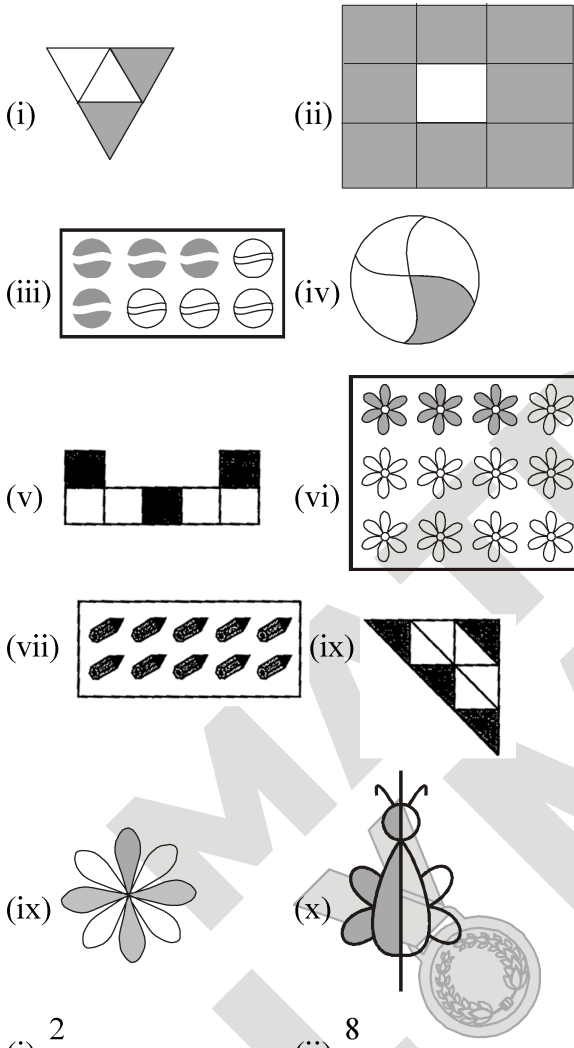
Ramesh takes less time by $\frac{216}{5} - \frac{52}{5}$

$= \frac{216 - 52}{5} = \frac{164}{5}$ minutes

EXERCISE 7.1

NS. 1

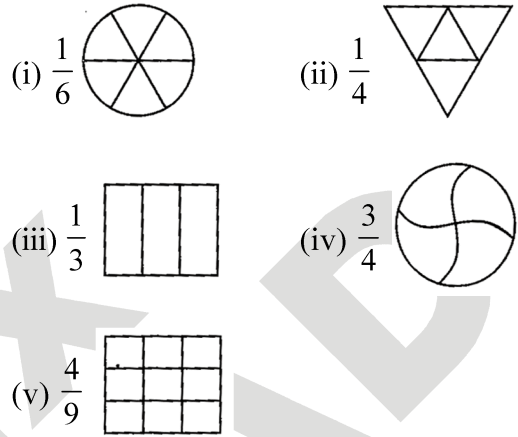
Write the fraction representing the shaded portion.



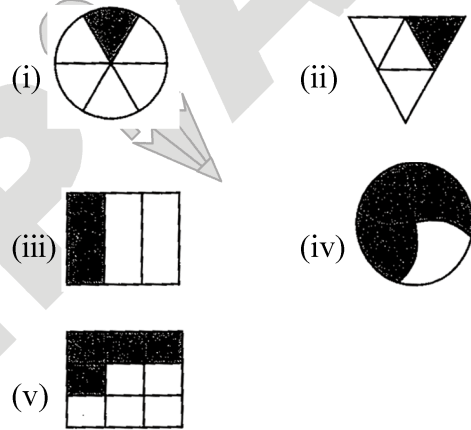
- Ans.**
- (i) $\frac{2}{4}$
 - (ii) $\frac{8}{9}$
 - (iii) $\frac{4}{8}$
 - (iv) $\frac{1}{4}$
 - (v) $\frac{3}{7}$
 - (vi) $\frac{3}{12}$
 - (vii) $\frac{10}{10}$
 - (viii) $\frac{4}{9}$
 - (ix) $\frac{4}{8}$
 - (x) $\frac{1}{2}$

NS. 2

Colour the part according to the given fraction.



Ans.



NS. 3

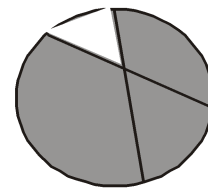
Identify the error, if any.



This is $\frac{1}{2}$



This is $\frac{1}{4}$



This is $\frac{3}{4}$

Ans. Shaded parts do not represent the given fractions, because all the figures are not equally divided. For making fractions, it is necessary that figure is to be divided in equal parts.

NS. 4

What fraction of a day is 8 hours?

Ans. Since, 1 day = 24 hours

Therefore, the fraction of 8 hours = $\frac{8}{24}$

NS. 5

What fraction of an hour is 40 minutes?

Ans. Since, 1 hour = 60 minutes.

Therefore, the fraction of 40 minutes = $\frac{40}{60}$

NS. 6

Arya, Abhimanyu, and Vivek shared lunch, Arya has brought two sandwiches, one made of vegetable and one of jam. The other two boys forgot to bring their lunch. Arya agreed to share his sandwiches so that each person will have an equal share of each sandwich.

(A) How can Arya divide his sandwiches so that each person has an equal share?

(B) What part of a sandwich will each boy receive ?

Ans. (A) Arya will divide each sandwich into three equal parts and give one part of each sandwich to each one of them.

(B) Each boy will get $\frac{1}{3}$ part of a sandwich.

NS. 7

Kanchan dyes dresses. She had to dye 30 dresses. She has so far finished 20 dresses. What fraction of dresses has she finished?

Ans. Total number of dresses = 30
she finished = 20

Fraction of finished work = $\frac{20}{30} = \frac{2}{3}$

NS. 8

Write the natural numbers from 2 to 12. What fraction of them are prime numbers?

Ans. Natural numbers from 2 to 12 :
2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12

Prime numbers from 2 to 12 :

2, 3, 5, 7, 11

Hence, fraction of prime numbers = $\frac{5}{11}$

NS. 9

Write the natural numbers from 102 to 113. What fraction of them are prime numbers?

Ans. Natural numbers from 102 to 113 :

102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113

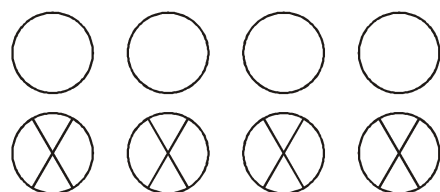
Prime numbers from 102 to 113 :

103, 107, 109, 113

Hence, fraction of prime numbers = $\frac{4}{12}$

NS. 10

What fraction of these circles have X's in them?



Ans. Total number of circles = 8
and number of circles having 'X' = 4

Hence, the required fraction = $\frac{4}{8}$

NS. 11

Kristin received a CD player for her birthday. She bought 3 CDs and received 5 others as gifts. What fractions of her total CDs did she buy and what fraction did she receive as gifts?

Ans. Total number of CDs = 3 + 5 = 8
Number of CDs purchased = 3

Fraction of CDs purchased = $\frac{3}{8}$

Fraction of CDs received as gifts = $\frac{5}{8}$

EXERCISE 7.2

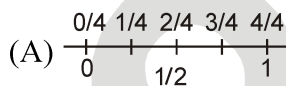
NS. 1

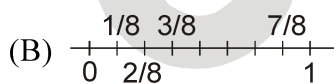
Draw number lines and locate the points on them :

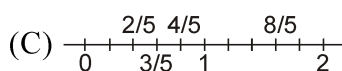
(A) $\frac{1}{2}, \frac{1}{4}, \frac{3}{4}, \frac{4}{4}$

(B) $\frac{1}{8}, \frac{2}{8}, \frac{3}{8}, \frac{7}{8}$

(C) $\frac{2}{3}, \frac{3}{5}, \frac{8}{5}, \frac{4}{5}$

Ans. (A) 

(B) 

(C) 

NS. 2

Express the following as mixed fractions :

(A) $\frac{20}{3}$

(B) $\frac{11}{5}$

(C) $\frac{17}{7}$

(D) $\frac{28}{5}$

(E) $\frac{19}{6}$

(F) $\frac{35}{9}$

Ans. (A)
$$\begin{array}{r} 3 \overline{) 20} \\ \underline{-18} \\ 2 \end{array}$$

$\therefore \frac{20}{3} = 6\frac{2}{3}$

(B)
$$\begin{array}{r} 2 \overline{) 11} \\ \underline{-10} \\ 1 \end{array}$$

$\therefore \frac{11}{5} = 2\frac{1}{5}$

(C)
$$\begin{array}{r} 2 \overline{) 17} \\ \underline{-14} \\ 3 \end{array}$$

$\therefore \frac{17}{7} = 2\frac{3}{7}$

(D)
$$\begin{array}{r} 5 \overline{) 28} \\ \underline{-25} \\ 3 \end{array}$$

$\therefore \frac{28}{5} = 5\frac{3}{5}$

(E)
$$\begin{array}{r} 3 \overline{) 19} \\ \underline{-18} \\ 1 \end{array}$$

$\therefore \frac{19}{6} = 3\frac{1}{6}$

(F)
$$\begin{array}{r} 3 \overline{) 35} \\ \underline{-27} \\ 8 \end{array}$$

$\therefore \frac{35}{9} = 3\frac{8}{9}$

NS. 3

Express the following as improper fractions :

(A) $7\frac{3}{4}$ (B) $5\frac{6}{7}$ (C) $2\frac{5}{6}$

(D) $10\frac{3}{5}$ (E) $9\frac{3}{7}$ (F) $8\frac{4}{9}$

Ans. (A) $7\frac{3}{4} = \frac{(7 \times 4) + 3}{4} = \frac{28 + 3}{4} = \frac{31}{4}$

(B) $5\frac{6}{7} = \frac{(5 \times 7) + 6}{7} = \frac{35 + 6}{7} = \frac{41}{7}$

(C) $2\frac{5}{6} = \frac{(2 \times 6) + 5}{6} = \frac{12 + 5}{6} = \frac{17}{6}$

(D) $10\frac{3}{5} = \frac{(10 \times 5) + 3}{5} = \frac{50 + 3}{5} = \frac{53}{5}$

(E) $9\frac{3}{7} = \frac{(9 \times 7) + 3}{7} = \frac{63 + 3}{7} = \frac{66}{7}$

(F) $8\frac{4}{9} = \frac{(8 \times 9) + 4}{9} = \frac{72 + 4}{9} = \frac{76}{9}$

EXERCISE 7.3

NS. 1

Write the fractions. Are all these fractions equivalent?



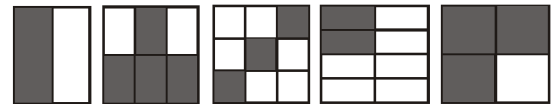
Ans. (A) Simplest forms of $\frac{1}{2}, \frac{2}{4}, \frac{3}{6}, \frac{4}{8}$ are $\frac{1}{2}, \frac{1}{2}, \frac{1}{2}, \frac{1}{2}$ respectively.
Yes, all of these fractions are equivalent.

(B) Simplest forms of $\frac{4}{12}, \frac{3}{9}, \frac{2}{6}, \frac{1}{3}, \frac{6}{15}$

are $\frac{1}{3}, \frac{1}{3}, \frac{1}{3}, \frac{1}{3}, \frac{2}{5}$ respectively.

NS. 2

Write the fractions and pair up the equivalent fractions from each row.



(a) (b) (c) (d) (e)



(i) (ii) (iii) (iv) (v)

Ans. (A) $\frac{1}{2}$ (B) $\frac{4}{6}$ (C) $\frac{3}{9}$

(D) $\frac{2}{8}$ (E) $\frac{3}{4}$

(i) $\frac{6}{18}$ (ii) $\frac{4}{8}$ (iii) $\frac{12}{16}$

(iv) $\frac{8}{12}$ (v) $\frac{4}{16}$

Pairs of equivalent fractions are:

(A) → (ii); (B) → (iv); (C) → (i); (D) → (v); (E) → (iii)

NS. 3

Replace \square in each of the following by correct number :

(A) $\frac{2}{7} = \frac{8}{\square}$

(B) $\frac{5}{8} = \frac{10}{\square}$

(C) $\frac{3}{5} = \frac{\square}{20}$

(D) $\frac{45}{60} = \frac{15}{\square}$

(E) $\frac{18}{24} = \frac{\square}{4}$

Ans. (A) $\frac{2}{7} = \frac{2 \times 4}{7 \times 4} = \frac{8}{28}$

(B) $\frac{5}{8} = \frac{5 \times 2}{8 \times 2} = \frac{10}{16}$

(C) $\frac{3}{5} = \frac{3 \times 4}{5 \times 4} = \frac{12}{20}$

(D) $\frac{45}{60} = \frac{45 \div 3}{60 \div 3} = \frac{15}{20}$

(E) $\frac{18}{24} = \frac{18 \div 6}{24 \div 6} = \frac{3}{4}$

NS. 4

Find the equivalent fraction of $\frac{3}{5}$ having

(A) denominator 20 (B) numerator 9

(C) denominator 30 (D) numerator 27

Ans. (A) $\frac{3}{5} = \frac{3 \times 4}{5 \times 4} = \frac{12}{20}$

(B) $\frac{3}{5} = \frac{3 \times 3}{5 \times 3} = \frac{9}{15}$

(C) $\frac{3}{5} = \frac{3 \times 6}{5 \times 6} = \frac{18}{30}$

(D) $\frac{3}{5} = \frac{3 \times 9}{5 \times 9} = \frac{27}{45}$

NS. 5

Find the equivalent fraction of $\frac{36}{48}$ with

(A) numerator 9

(B) denominator 4

Ans. (A) $\frac{36}{48} = \frac{36 \div 4}{48 \div 4} = \frac{9}{12}$

(B) $\frac{36}{48} = \frac{36 \div 12}{48 \div 12} = \frac{3}{4}$

NS. 6

Check whether the given fractions are equivalent :

(A) $\frac{5}{9}, \frac{30}{54}$

(B) $\frac{3}{10}, \frac{12}{50}$

(C) $\frac{7}{13}, \frac{5}{11}$

Ans. (A) Simplest forms of $\frac{30}{54}$ is $\frac{5}{9}$.

Therefore, $\frac{5}{9}$ and $\frac{30}{54}$ are equivalent.

(B) Simplest form of $\frac{12}{50}$ is $\frac{6}{25}$.

Therefore, $\frac{3}{10}$ and $\frac{12}{50}$ are not equivalent.

(C) HCF (7, 13) = 1; simplest form of $\frac{7}{13}$ is $\frac{7}{13}$

HCF (5, 11) = 1 ; simplest form of $\frac{5}{11}$ is $\frac{5}{11}$.

Therefore, $\frac{7}{13}$ and $\frac{5}{11}$ are not equivalent.

NS. 7

Reduce the following fractions to simplest form :

(A) $\frac{48}{60}$

(B) $\frac{150}{60}$

(C) $\frac{84}{98}$

(D) $\frac{12}{52}$

(E) $\frac{7}{28}$

Ans. (A) $\frac{48}{60} = \frac{2 \times 2 \times 2 \times 2 \times 3}{2 \times 2 \times 3 \times 5} = \frac{4}{5}$
 (B) $\frac{150}{60} = \frac{3 \times 5 \times 10}{2 \times 3 \times 10} = \frac{5}{2}$
 (C) $\frac{84}{98} = \frac{2 \times 7 \times 6}{2 \times 7 \times 7} = \frac{6}{7}$
 (D) $\frac{12}{52} = \frac{2 \times 2 \times 3}{2 \times 2 \times 13} = \frac{3}{13}$
 (E) $\frac{7}{28} = \frac{7}{2 \times 2 \times 7} = \frac{1}{4}$

NS. 8

Ramesh had 20 pencils, Sheelu had 50 pencils and Jammal had 80 pencils. After 4 months, Ramesh used up 10 pencils, Sheelu used up 25 pencils and Jammal used up 40 pencils. What fraction did each use up? Check if each has used up an equal fraction of her/his pencils?

Ans. Ramesh : Total pencils = 20
 Pencils used = 10; Fraction = $\frac{10}{20} = \frac{1}{2}$
 Sheelu : Total pencils = 50
 Pencils used = 25; Fraction = $\frac{25}{50} = \frac{1}{2}$
 Jammaal : Total pencils = 80
 Pencils used = 40; Fraction = $\frac{40}{80} = \frac{1}{2}$
 Since, all of them used half of their pencils, therefore, each has used up equal fraction of pencils.

NS. 9

Match the equivalent fractions and write two more for each.

(i) $\frac{250}{400}$ (A) $\frac{2}{3}$

(ii) $\frac{180}{200}$ (B) $\frac{2}{5}$
 (iii) $\frac{660}{990}$ (C) $\frac{1}{2}$
 (iv) $\frac{180}{360}$ (D) $\frac{5}{8}$
 (v) $\frac{220}{550}$ (E) $\frac{9}{10}$

Ans. (i) → (D); (ii) → (E); (iii) → (A); (iv) → (C); (v) → (B)

(i) $\frac{250}{400} = \frac{250 \div 50}{400 \div 50} = \frac{5}{8}$

Also, equivalent fractions of $\frac{5}{8}$ are

$\frac{5}{8} = \frac{5 \times 2}{8 \times 2} = \frac{10}{16}$, $\frac{5}{8} = \frac{5 \times 3}{8 \times 3} = \frac{15}{24}$

(ii) $\frac{180}{200} = \frac{180 \div 20}{200 \div 20} = \frac{9}{10}$

Also, equivalent fractions of $\frac{9}{10}$ are

$\frac{9}{10} = \frac{9 \times 2}{10 \times 2} = \frac{18}{20}$, $\frac{9}{10} = \frac{9 \times 3}{10 \times 3} = \frac{27}{30}$

(iii) $\frac{690}{990} = \frac{660 \div 330}{990 \div 330} = \frac{2}{3}$

Also, equivalent fractions of $\frac{2}{3}$ are

$\frac{2 \times 2}{3 \times 2} = \frac{4}{6} = \frac{2 \times 3}{3 \times 3} = \frac{6}{9}$

(iv) $\frac{180}{360} = \frac{180 \div 180}{360 \div 180} = \frac{1}{2}$

Also, equivalent fractions of $\frac{1}{2}$ are

$\frac{1}{2} = \frac{1 \times 2}{2 \times 2} = \frac{2}{4}$, $\frac{1}{2} = \frac{1 \times 3}{2 \times 3} = \frac{3}{6}$

$$(v) \frac{220}{550} = \frac{220 \div 110}{550 \div 110} = \frac{2}{5}$$

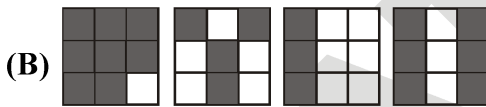
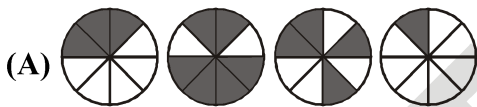
Also, equivalent fractions of $\frac{2}{5}$ are

$$\frac{2}{5} = \frac{2 \times 2}{5 \times 2} = \frac{4}{10}, \quad \frac{2}{5} = \frac{2 \times 3}{5 \times 3} = \frac{6}{15}$$

EXERCISE 7.4

NS. 1

Write shaded portion as fraction. Arrange them in ascending and descending order using correct sign '<', '=', '>' between the fractions:



(C) Show $\frac{2}{6}, \frac{4}{6}, \frac{8}{6}$ and $\frac{6}{6}$ on the number line.

Put appropriate signs between the fractions given.

$$\frac{5}{6} \square \frac{2}{6}, \frac{3}{6} \square 0, \frac{1}{6} \square \frac{6}{6}, \frac{8}{6} \square \frac{5}{6}$$

Ans. (A) Shaded fraction : $\frac{3}{8}, \frac{6}{8}, \frac{4}{8}, \frac{1}{8}$

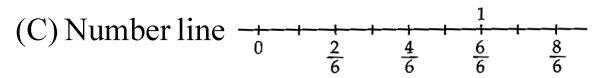
Ascending order : $\frac{1}{8} < \frac{3}{8} < \frac{4}{8} < \frac{6}{8}$

Descending order : $\frac{6}{8} > \frac{4}{8} > \frac{3}{8} > \frac{1}{8}$

(B) Shaded fraction : $\frac{8}{9}, \frac{4}{9}, \frac{3}{9}, \frac{6}{9}$

Ascending order : $\frac{3}{9} < \frac{4}{9} < \frac{6}{9} < \frac{8}{9}$

Descending order : $\frac{8}{9} > \frac{6}{9} > \frac{4}{9} > \frac{3}{9}$



$$\frac{5}{6} \square \frac{2}{6}, \frac{3}{6} \square 0, \frac{1}{6} \square \frac{6}{6}, \frac{8}{6} \square \frac{5}{6}$$

NS. 2

Compare the fractions and put an appropriate sign.

(A) $\frac{3}{6} \square \frac{5}{6}$

(B) $\frac{1}{7} \square \frac{1}{4}$

(C) $\frac{4}{5} \square \frac{5}{5}$

(D) $\frac{3}{5} \square \frac{3}{7}$

Ans. (A) $\frac{3}{6}$ and $\frac{5}{6}$ are like fractions.

Also, numerator of $\frac{5}{6}$ is greater than numerator

of $\frac{3}{6} \therefore \frac{3}{6} < \frac{5}{6}$

(B) $\frac{1}{7}$ and $\frac{1}{4}$ are unlike fractions with same

numerator. Also, denominator of $\frac{1}{7}$ is greater than

denominator of $\frac{1}{4} \therefore \frac{1}{7} < \frac{1}{4}$

(C) $\frac{4}{5}$ and $\frac{5}{5}$ are like fractions.

Also, numerator of $\frac{5}{5}$ is greater than numerator

of $\frac{4}{5} \therefore \frac{4}{5} < \frac{5}{5}$

(D) $\frac{3}{5}$ and $\frac{3}{7}$ are unlike fractions with same numerator. Also, denominator of $\frac{3}{7}$ is greater than denominator of $\frac{3}{5}$. $\therefore \frac{3}{5} > \frac{3}{7}$

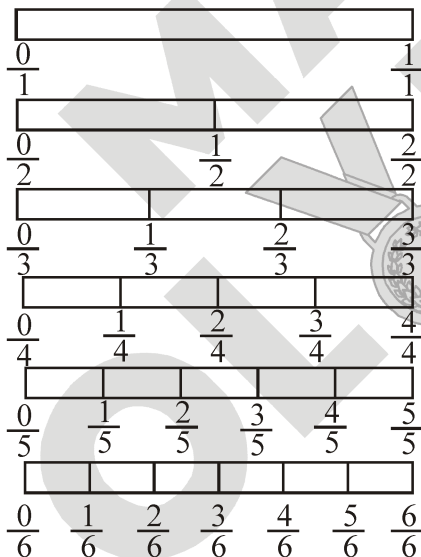
NS. 3

Make five more such pairs and put appropriate signs.

- Ans. (A) $\frac{9}{10} > \frac{6}{10}$ (B) $\frac{1}{3} > \frac{1}{6}$
 (C) $\frac{1}{8} < \frac{1}{5}$ (D) $\frac{7}{8} < \frac{11}{8}$
 (E) $\frac{11}{13} > \frac{9}{13}$

NS. 4

Look at the figure and write '<', '>', '=' between the given pairs of fractions.



- (A) $\frac{1}{6} \square \frac{1}{3}$ (B) $\frac{3}{4} \square \frac{2}{6}$

(C) $\frac{2}{3} \square \frac{2}{4}$ (D) $\frac{6}{6} \square \frac{3}{3}$

(E) $\frac{5}{6} \square \frac{5}{5}$

Make five more such problems and solve them with your friends.

Ans. (A) $\frac{1}{6} < \frac{1}{3}$ (B) $\frac{3}{4} > \frac{2}{6}$

(C) $\frac{2}{3} > \frac{2}{4}$ (D) $\frac{6}{6} = \frac{3}{3}$

(E) $\frac{5}{6} < \frac{5}{5}$

Five more problems :

(A) $\frac{1}{2} \square \frac{3}{6}$ (B) $\frac{2}{3} \square \frac{3}{5}$

(C) $\frac{3}{4} \square \frac{4}{6}$ (D) $\frac{5}{6} \square \frac{2}{2}$

(E) $\frac{0}{1} \square \frac{0}{6}$

Above problems are solved as follows :

(A) $\frac{1}{2} = \frac{3}{6}$ (B) $\frac{2}{3} > \frac{3}{5}$

(C) $\frac{3}{4} > \frac{4}{6}$ (D) $\frac{5}{6} < \frac{2}{2}$

(E) $\frac{0}{1} = \frac{0}{6}$

NS. 5

How quickly can you do this? Fill appropriate sign. ('<', '=', '>')

(A) $\frac{1}{2} \square \frac{1}{5}$ (B) $\frac{2}{4} \square \frac{3}{6}$

(C) $\frac{3}{5} \square \frac{2}{3}$ (D) $\frac{3}{4} \square \frac{2}{8}$

(E) $\frac{3}{5} \square \frac{6}{5}$ (F) $\frac{7}{9} \square \frac{3}{9}$

(G) $\frac{1}{4} \square \frac{2}{8}$

(H) $\frac{6}{10} \square \frac{4}{5}$

(I) $\frac{3}{4} \square \frac{7}{8}$

(J) $\frac{6}{10} \square \frac{4}{5}$

(K) $\frac{5}{7} \square \frac{15}{21}$

Ans. (A) $\frac{1}{2}$ and $\frac{1}{5}$ are unlike fractions with same numerator. Also, denominator of $\frac{1}{5}$ is greater than denominator of $\frac{1}{2}$.

$$\therefore \frac{1}{2} > \frac{1}{5}$$

(B) $\frac{2}{4}$ and $\frac{3}{6}$ are unlike fractions with different numerator.

$$\frac{2}{4} = \frac{2 \div 2}{4 \div 2} = \frac{1}{2} \text{ and } \frac{3}{6} = \frac{3 \div 3}{6 \div 3} = \frac{1}{2}$$

$$\therefore \frac{2}{4} = \frac{3}{6}$$

(C) $\frac{3}{5}$ and $\frac{2}{3}$ are unlike fractions with different numerator.

$$\frac{3}{5} = \frac{3 \times 3}{5 \times 3} = \frac{9}{15} \text{ and } \frac{2}{3} = \frac{2 \times 5}{3 \times 5} = \frac{10}{15}$$

$$\therefore \frac{9}{15} < \frac{10}{15} \Rightarrow \frac{3}{5} < \frac{2}{3}$$

(D) $\frac{3}{4}$ and $\frac{2}{8}$ are unlike fractions with different numerators.

$$\frac{3}{4} = \frac{3 \times 2}{4 \times 2} = \frac{6}{8} \text{ and } \frac{2}{8} = \frac{2}{8}$$

$$\therefore \frac{6}{8} > \frac{2}{8} \Rightarrow \frac{3}{4} > \frac{2}{8}$$

(E) $\frac{3}{5}$ and $\frac{6}{5}$ are like fractions. Also, numerator of $\frac{6}{5}$ is greater than numerator of $\frac{3}{5}$.

$$\therefore \frac{3}{5} < \frac{6}{5}$$

(F) $\frac{7}{9}$ and $\frac{3}{9}$ are like fractions. Also, numerator of $\frac{7}{9}$ is greater than numerator of $\frac{3}{9}$.

$$\therefore \frac{7}{9} > \frac{3}{9}$$

(G) $\frac{1}{4}$ and $\frac{2}{8}$ are unlike fractions with different numerators.

$$\frac{1}{4} = \frac{1 \times 2}{4 \times 2} = \frac{2}{8}$$

$$\therefore \frac{2}{8} = \frac{2}{8} \Rightarrow \frac{1}{4} = \frac{2}{8}$$

(H) $\frac{6}{10}$ and $\frac{4}{5}$ are unlike fractions with different numerators.

$$\frac{6}{10} = \frac{6 \div 2}{10 \div 2} = \frac{3}{5}$$

$$\therefore \frac{3}{5} < \frac{4}{5} \Rightarrow \frac{6}{10} < \frac{4}{5}$$

(I) $\frac{3}{4}$ and $\frac{7}{8}$ are unlike fractions with different numerators.

$$\frac{3}{4} = \frac{3 \times 2}{4 \times 2} = \frac{6}{8} \quad \therefore \frac{6}{8} < \frac{7}{8} \Rightarrow \frac{3}{4} < \frac{7}{8}$$

(J) $\frac{6}{10}$ and $\frac{4}{5}$ are unlike fraction with different numerators.

$$\frac{6}{10} = \frac{6 \div 2}{10 \div 2} = \frac{3}{5} \quad \therefore \frac{3}{5} < \frac{4}{5} \quad \Rightarrow \frac{6}{10} < \frac{4}{5}$$

(K) $\frac{5}{7}$ and $\frac{15}{21}$ are unlike fractions with different numerators.

$$\frac{5}{7} = \frac{5 \times 3}{7 \times 3} = \frac{15}{21} \quad \therefore \frac{15}{21} = \frac{15}{21} \quad \Rightarrow \frac{5}{7} = \frac{15}{21}$$

NS. 6

The following fractions represent just three different numbers. Separate them into three groups of equivalent fractions, by changing each one to its simplest form.

(A) $\frac{2}{12}$ (B) $\frac{3}{15}$ (C) $\frac{8}{50}$

(D) $\frac{16}{100}$ (E) $\frac{10}{60}$ (F) $\frac{15}{75}$

(G) $\frac{12}{60}$ (H) $\frac{16}{96}$ (I) $\frac{12}{75}$

(J) $\frac{12}{72}$ (K) $\frac{3}{18}$ (L) $\frac{4}{25}$

Ans. (A) $\frac{2}{12} = \frac{2 \div 2}{12 \div 2} = \frac{1}{6}$ (B) $\frac{3}{15} = \frac{3 \div 3}{15 \div 3} = \frac{1}{5}$
 (C) $\frac{8}{50} = \frac{8 \div 2}{50 \div 2} = \frac{4}{25}$ (D) $\frac{16}{100} = \frac{16 \div 4}{100 \div 4} = \frac{4}{25}$
 (E) $\frac{10}{60} = \frac{10 \div 10}{60 \div 10} = \frac{1}{6}$ (F) $\frac{15}{75} = \frac{15 \div 15}{75 \div 15} = \frac{1}{5}$
 (G) $\frac{12}{60} = \frac{12 \div 12}{60 \div 12} = \frac{1}{5}$ (H) $\frac{16}{96} = \frac{16 \div 16}{96 \div 16} = \frac{1}{6}$
 (I) $\frac{12}{75} = \frac{12 \div 3}{75 \div 3} = \frac{4}{25}$ (J) $\frac{12}{72} = \frac{12 \div 12}{72 \div 12} = \frac{1}{6}$
 (K) $\frac{3}{18} = \frac{3 \div 3}{18 \div 3} = \frac{1}{6}$ (L) $\frac{4}{25} = \frac{4}{25}$

Equivalent groups :

I group : $\frac{1}{5}$ [(B), (F), (G)]

II group : $\frac{1}{6}$;(A), (E), (H), (J), (K)]

III group : $\frac{4}{25}$ [(C), (D), (L), (I)]

NS. 7

Find answer to the following. Write and indicate how you solved them.

(A) Is $\frac{5}{9}$ equal to $\frac{4}{5}$?

(B) Is $\frac{9}{16}$ equal to $\frac{5}{9}$?

(C) Is $\frac{4}{5}$ equal to $\frac{16}{20}$?

(D) Is $\frac{1}{15}$ equal to $\frac{4}{30}$?

Ans. (A) $\frac{5}{9}$ and $\frac{4}{5} \Rightarrow \frac{5 \times 5}{9 \times 5} = \frac{25}{45}$ and $\frac{4 \times 9}{5 \times 9} = \frac{36}{45}$
 [∵ L.C.M. of 9 and 5 is 45]

Since, $\frac{25}{45} < \frac{36}{45}$. Therefore, $\frac{5}{9} < \frac{4}{5}$

(B) $\frac{9}{16}$ and $\frac{5}{9} \Rightarrow \frac{9 \times 9}{16 \times 9} = \frac{81}{144}$ and $\frac{5 \times 16}{9 \times 16} = \frac{80}{144}$
 [∵ L.C.M. of 16 and 9 is 144]

Since, $\frac{81}{144} > \frac{80}{144}$. Therefore, $\frac{9}{16} < \frac{5}{9}$

(C) $\frac{4}{5}$ and $\frac{16}{20} \Rightarrow \frac{4 \times 4}{5 \times 4} = \frac{16}{20}$ and $\frac{16 \times 1}{20 \times 1} = \frac{16}{20}$
 [∵ L.C.M. of 5 and 20 is 20]

since, $\frac{16}{20} = \frac{16}{20}$. Therefore, $\frac{4}{5} = \frac{16}{20}$

(D) $\frac{1}{15}$ and $\frac{4}{30} \Rightarrow \frac{1 \times 2}{15 \times 2} = \frac{2}{30}$ and $\frac{4 \times 1}{30 \times 1} = \frac{4}{30}$
 [∵ L.C.M. of 15 and 30 is 30]

Since, $\frac{2}{30} < \frac{4}{30}$. Therefore, $\frac{1}{15} < \frac{4}{30}$

NS. 8

Ila read 25 pages of a book containing 100 pages. Lalita read $\frac{2}{5}$ of the same book. Who read less?

Ans. Ila read 25 pages out of 100 pages.
 Fraction of reading the pages

$$= \frac{25}{100} = \frac{1}{4} \text{ of book}$$

Comparing Ila and Lalita pages

$$\frac{1}{4} \text{ and } \frac{2}{5} \Rightarrow \frac{1 \times 5}{4 \times 5} = \frac{5}{20} \text{ and } \frac{2 \times 4}{5 \times 4} = \frac{8}{20}$$

[∵ L.C.M of 5 and 4 is 20]

$$\therefore \frac{5}{20} < \frac{8}{20} \Rightarrow \frac{1}{4} < \frac{2}{5}$$

Therefore, Ila read less.

NS. 9

Rafiq exercised for $\frac{3}{6}$ of an hour, while Rohit exercised for $\frac{3}{4}$ of an hour. Who exercised for a longer time?

Ans. Rafiq exercised $\frac{3}{6}$ of an hour.

Rohit exercised $\frac{3}{4}$ of an hour.

Since, $\frac{3}{4} > \frac{3}{6}$. Therefore, Rohit exercised for a longer time.

NS. 10

In a class A of 25 students, 20 passed in first class, in another class B of 30 students, 24 passed in first class. In which class was a greater fraction of students getting first class?

Ans. In class A, 20 passed in first class out of 25.
 ∴ Fraction of first class passed students

$$= \frac{20}{25} = \frac{4}{5}$$

In class B, 24 passed in first class out of 30.

∴ Fraction of first class passed students

$$= \frac{24}{30} = \frac{4}{5}$$

Hence, both classes have same fraction of student getting first class.

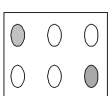
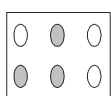
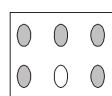
EXERCISE 7.5

NS. 1

Write these fractions appropriately as additions or subtractions :

(A)  = 

(B)  ...  = 

(C)  ...  = 

Ans. (A) $+: \frac{1}{5} + \frac{2}{5} = \frac{1+2}{5} = \frac{3}{5}$

(B) $+: \frac{5}{4} - \frac{3}{5} = \frac{5-3}{5} = \frac{2}{5}$

(C) $+: \frac{2}{6} + \frac{3}{6} = \frac{2+3}{6} = \frac{5}{6}$

NS. 2

Solve :

(A) $\frac{1}{18} + \frac{1}{18}$

(B) $\frac{8}{15} + \frac{3}{15}$

(C) $\frac{7}{7} - \frac{5}{7}$

(D) $\frac{1}{22} + \frac{21}{22}$

(E) $\frac{12}{15} - \frac{7}{15}$

(F) $\frac{5}{8} + \frac{3}{8}$

(G) $1 - \frac{2}{3} \left(1 = \frac{3}{3}\right)$

(H) $\frac{1}{4} + \frac{0}{4}$

(I) $3 - \frac{12}{5}$

Ans. (A) $\frac{1}{18} + \frac{1}{18} = \frac{1+1}{18} = \frac{2}{18} = \frac{1}{9}$

(B) $\frac{8}{15} + \frac{3}{15} = \frac{8+3}{15} = \frac{11}{15}$

(C) $\frac{7}{7} - \frac{5}{7} = \frac{7-5}{7} = \frac{2}{7}$

(D) $\frac{1}{22} + \frac{21}{22} = \frac{1+21}{22} = \frac{22}{22} = 1$

(E) $\frac{12}{15} - \frac{7}{15} = \frac{12-7}{15} = \frac{5}{15} = \frac{1}{3}$

(F) $\frac{5}{8} + \frac{3}{8} = \frac{5+3}{8} = \frac{8}{8} = 1$

(G) $1 - \frac{2}{3} = \frac{3}{3} - \frac{2}{3} = \frac{3-2}{3} = \frac{1}{3}$

(H) $\frac{1}{4} + \frac{0}{4} = \frac{1+0}{4} = \frac{1}{4}$

(I) $3 - \frac{12}{5} = \frac{15}{5} - \frac{12}{5} = \frac{15-12}{5} = \frac{3}{5}$

NS. 3

Shubham painted $\frac{2}{3}$ of the wall space in his room. His sister Madhavi helped and painted $\frac{1}{3}$ of the wall space. How much did they paint together?

Ans. Fraction of wall painted by Shubham = $\frac{2}{3}$

Fraction of wall painted by Madhavi = $\frac{1}{3}$

Total painting by both of them

$= \frac{2}{3} + \frac{1}{3} = \frac{2+1}{3} = \frac{3}{3} = 1$

Therefore, they painted complete wall.

NS. 4

Fill in the missing fractions.

(A) $\frac{7}{10} - \square = \frac{3}{10}$

(B) $\square - \frac{3}{21} = \frac{5}{21}$

(C) $\square - \frac{3}{6} = \frac{3}{6}$

(D) $\square + \frac{5}{27} = \frac{12}{27}$

Ans. (A) $\frac{7}{10} - \frac{4}{10} = \frac{7-4}{10} = \frac{3}{10}$

(B) $\frac{8}{21} - \frac{3}{21} = \frac{8-3}{21} = \frac{5}{21}$

(C) $\frac{6}{6} - \frac{3}{6} = \frac{6-3}{6} = \frac{3}{6}$

(D) $\frac{7}{27} + \frac{5}{27} = \frac{7+5}{27} = \frac{12}{27}$

NS. 5

Javed was given $\frac{5}{7}$ of a basket of oranges.

What fraction of oranges was left in the basket?

Ans. Consider the total number of oranges to be the whole portion or 1.

$$\text{Fraction of oranges left} = 1 - \frac{5}{7}$$

$$= \frac{7}{7} - \frac{5}{7} = \frac{7-5}{7} = \frac{2}{7}$$

Thus, $\frac{2}{7}$ of oranges was left in the basket.

EXERCISE 7.6

NS. 1

Solve :

(A) $\frac{2}{3} + \frac{1}{7}$ (B) $\frac{3}{10} + \frac{7}{15}$ (C) $\frac{4}{9} + \frac{2}{7}$

(D) $\frac{5}{7} + \frac{1}{3}$ (E) $\frac{2}{5} + \frac{1}{6}$ (F) $\frac{4}{5} + \frac{2}{3}$

(G) $\frac{3}{4} - \frac{1}{3}$ (H) $\frac{5}{6} - \frac{1}{3}$ (I) $\frac{2}{3} + \frac{3}{4} + \frac{1}{2}$

(J) $\frac{1}{2} + \frac{1}{3} + \frac{1}{6}$ (K) $1\frac{1}{3} + 3\frac{2}{3}$ (L) $4\frac{2}{3} + 3\frac{1}{4}$

(M) $\frac{16}{5} - \frac{7}{5}$ (N) $\frac{4}{3} - \frac{1}{2}$

Ans. (A) L.C.M of 3 and 7 is 21,

$$\therefore \frac{2}{3} + \frac{1}{7} = \frac{2 \times 7 + 1 \times 3}{21} = \frac{14 + 3}{21} = \frac{17}{21}$$

(B) L.C.M of 10 and 15 is 30,

$$\therefore \frac{3}{10} + \frac{7}{15} = \frac{3 \times 3 + 7 \times 2}{30} = \frac{9 + 14}{30} = \frac{23}{30}$$

(C) L.C.M. of 9 and 7 is 63,

$$\therefore \frac{4}{9} + \frac{2}{7} = \frac{4 \times 7 + 2 \times 9}{63} = \frac{28 + 18}{63} = \frac{46}{63}$$

(D) L.C.M of 7 and 3 is 21,

$$\therefore \frac{5}{7} + \frac{1}{3} = \frac{5 \times 3 + 7 \times 1}{21} = \frac{15 + 7}{21} = \frac{22}{21} = 1\frac{1}{21}$$

(E) L.C.M of 5 and 6 is 30,

$$\therefore \frac{2}{5} + \frac{1}{6} = \frac{2 \times 6 + 5 \times 1}{30} = \frac{12 + 5}{30} = \frac{17}{30}$$

(F) L.C.M of 5 and 3 is 15,

$$\therefore \frac{4}{5} + \frac{2}{3} = \frac{4 \times 3 + 2 \times 5}{15} = \frac{12 + 10}{15} = \frac{22}{15} = 1\frac{7}{15}$$

(G) L.C.M of 4 and 3 is 12,

$$\therefore \frac{3}{4} - \frac{1}{3} = \frac{3 \times 3 - 4 \times 1}{12} = \frac{9 - 4}{12} = \frac{5}{12}$$

(H) L.C.M of 6 and 3 is 6,

$$\therefore \frac{5}{6} - \frac{1}{3} = \frac{5 \times 1 - 2 \times 1}{6} = \frac{5 - 2}{6} = \frac{3}{6} = \frac{1}{2}$$

(I) L.C.M of 3, 4 and 2 is 12,

$$\begin{aligned} \therefore \frac{2}{3} + \frac{3}{4} + \frac{1}{2} &= \frac{2 \times 4 + 3 \times 3 + 1 \times 6}{12} \\ &= \frac{8 + 9 + 6}{12} = \frac{23}{12} = 1\frac{11}{12} \end{aligned}$$

(J) L.C.M of 2, 3 and 6 is 6,

$$\begin{aligned} \frac{1}{2} + \frac{1}{3} + \frac{1}{6} &= \frac{1 \times 3 + 1 \times 2 + 1 \times 1}{6} \\ &= \frac{3 + 2 + 1}{6} = \frac{6}{6} = 1 \end{aligned}$$

(K) L.C.M of 3 and 3 is 3,

$$\therefore \frac{4}{3} + \frac{11}{3} = \frac{4 + 11}{3} = \frac{15}{3} = 5$$

(L) L.C.M of 3 and 4 is 12,

$$\begin{aligned} \therefore \frac{14}{3} + \frac{13}{4} &= \frac{14 \times 4 + 13 \times 3}{12} \\ &= \frac{56 + 39}{12} = \frac{95}{12} = 7\frac{11}{12} \end{aligned}$$

(M) L.C.M of 5 and 5 is 5,

$$\therefore \frac{16}{5} - \frac{7}{5} = \frac{16 - 7}{5} = \frac{9}{5} = 1\frac{4}{5}$$

(N) L.C.M of 3 and 2 is 6,

$$\therefore \frac{4}{3} - \frac{1}{2} = \frac{4 \times 2 - 1 \times 3}{6} = \frac{8 - 3}{6} = \frac{5}{6}$$

NS. 2

Sarita bought $\frac{2}{5}$ metre of ribbon and Lalita

$\frac{3}{4}$ metre of ribbon. What is the total length of the ribbon they bought?

Ans. Ribbon bought by Sarita = $\frac{2}{5}$ m

And Ribbon bought by Lalita = $\frac{3}{4}$ m

Total length of ribbon = $\frac{2}{5} + \frac{3}{4} = \frac{2 \times 4 + 5 \times 3}{20}$

[∵ L.C.M of 5 and 4 is 20]

= $\frac{8+15}{20} = \frac{23}{20} = 1\frac{3}{20}$ m

Therefore, they bought $1\frac{3}{20}$ m of ribbon.

NS. 3

Naina was given $1\frac{1}{2}$ piece of cake and Najma

was given $1\frac{1}{3}$ piece of cake. Find the total amount of cake was given to both of them.

Ans. Cake taken by Naina = $1\frac{1}{2}$ piece

and cake taken by Najma = $1\frac{1}{3}$ piece

total cake taken = $1\frac{1}{2} + 1\frac{1}{3} = \frac{3}{2} + \frac{4}{3}$

= $\frac{3 \times 3 + 4 \times 2}{6}$ [∵ L.C.M of 3 and 2 is 6]

= $\frac{9+8}{6} = \frac{17}{6} = 2\frac{5}{6}$

Therefore, total amount of cake given to both of

them = $2\frac{5}{6}$.

NS. 4

Fill in the boxes ;

(A) $\square - \frac{5}{8} = \frac{1}{4}$ (B) $\square - \frac{1}{5} = \frac{1}{2}$

(C) $\frac{1}{2} - \square = \frac{1}{6}$

Ans. (A) $\frac{1}{4} + \frac{5}{8} = \frac{2+5}{8} = \frac{7}{8}$

(B) $\frac{1}{2} + \frac{1}{5} = \frac{5+2}{10} = \frac{7}{10}$

(C) $\frac{1}{2} - \frac{1}{6} = \frac{3-1}{6} = \frac{2}{6} = \frac{1}{3}$

NS. 5

Complete the addition-subtraction box.

(A)

	$\frac{2}{3}$	$\frac{4}{3}$	
\ominus	$\frac{1}{3}$	$\frac{2}{3}$	

(B)

	$\frac{1}{2}$	$\frac{1}{3}$	
\ominus	$\frac{1}{3}$	$\frac{1}{4}$	

Ans. (A)

	$\frac{2}{3}$	$\frac{4}{3}$	$\frac{6}{3}=2$
\ominus	$\frac{1}{3}$	$\frac{2}{3}$	$\frac{3}{3}=1$
	$\frac{1}{3}$	$\frac{2}{3}$	$\frac{3}{3}=1$

(B)

	$\frac{1}{2}$	$\frac{1}{3}$	$\frac{5}{6}$
\ominus	$\frac{1}{3}$	$\frac{1}{4}$	$\frac{7}{12}$
	$\frac{1}{6}$	$\frac{1}{12}$	$\frac{3}{12}=1$

NS. 6

A piece of wire $\frac{7}{8}$ metre long broke into two pieces. One piece was $\frac{1}{4}$ metre long. How long is the other piece?

Ans. Total length of wire = $\frac{7}{8}$ metre

Length of first part = $\frac{1}{4}$ metre

Remaining part = $\frac{7}{8} - \frac{1}{4} = \frac{7 \times 1 - 2 \times 1}{8}$
 [\because L.C.M of 8 and 4 is 8]

= $\frac{7-2}{8} = \frac{5}{8}$ metre

Therefore, the length of remaining part is $\frac{5}{8}$ metre.

NS. 7

Nandini's house is $\frac{9}{10}$ km from her school. She walked some distance and then took a bus for $\frac{1}{2}$ km to reach the school. How far did she walk?

Ans. Total distance between school and house = $\frac{9}{10}$ km

Distance covered by bus = $\frac{1}{2}$ km

Remaining distance = $\frac{9}{10} - \frac{1}{2} = \frac{9 \times 1 - 1 \times 5}{10}$
 [\because L.C.M. of 10 and 2 is 10]

= $\frac{9-5}{10} = \frac{4}{10} = \frac{2}{5}$ km

Therefore, distance covered by walking is $\frac{2}{5}$ km.

NS. 8

Asha and Samuel have book shelves of the same size partly filled with books. Asha's shelf is $\frac{5}{6}$ full and Samuel's shelf is $\frac{2}{5}$ th full. Whose bookshelf is more full? By what fraction?

Ans. Equivalent fraction of $\frac{5}{6}$ and $\frac{2}{5}$ is

$\Rightarrow \frac{5}{6} = \frac{5 \times 5}{6 \times 5} = \frac{25}{30}$ and $\frac{2}{5} = \frac{2 \times 6}{5 \times 6} = \frac{12}{30}$
 [\because L.C.M of 6 and 5 is 30]

$\therefore \frac{25}{30} > \frac{12}{30} \Rightarrow \frac{5}{6} > \frac{2}{5}$

\therefore Asha's bookshelf is more covered than Samuel.

Difference = $\frac{25}{30} - \frac{12}{30} = \frac{13}{30}$

NS. 9

Jaidev takes $2\frac{1}{5}$ minutes to walk across the school ground. Rahul takes $\frac{7}{4}$ minutes to do the same. Who takes less time and by what fraction?

Ans. Time taken by Jaidev = $2\frac{1}{5}$ minutes

= $\frac{11}{5}$ minutes

Time taken by Rahul = $\frac{7}{4}$ minutes

Difference = $\frac{11}{5} - \frac{7}{4} = \frac{11 \times 4 - 7 \times 5}{20}$
 [\because L.C.M of 5 and 4 is 20]

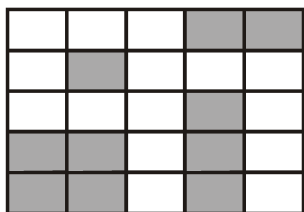
= $\frac{44-35}{20} = \frac{9}{20}$ minutes

Thus, Rahul takes less time, which is $\frac{9}{20}$ minutes.

EXERCISE – I

ONLY ONE CORRECT TYPE

1. Which fraction describes the shaded regions in the following figure ?



- (A) $\frac{2}{5}$ (B) $\frac{11}{25}$
 (C) $\frac{12}{25}$ (D) $\frac{4}{5}$
2. Which of the following fractions is nearest to $\frac{3}{5}$?

- (A) $\frac{499}{600}$ (B) $\frac{599}{600}$
 (C) $\frac{299}{500}$ (D) $\frac{399}{500}$

3. Which fraction describes the value of A.



- (A) $2\frac{4}{5}$ (B) $2\frac{2}{5}$
 (C) $2\frac{1}{2}$ (D) $2\frac{3}{4}$
4. Write $25\frac{2}{5}$ as an improper fraction ?

- (A) $\frac{125}{5}$ (B) $\frac{127}{5}$
 (C) $\frac{128}{5}$ (D) $\frac{50}{5}$

5. Write $\frac{138}{5}$ as a mixed number.

- (A) $27\frac{1}{5}$ (B) $27\frac{2}{5}$
 (C) $27\frac{3}{5}$ (D) $27\frac{4}{5}$

6. $\frac{1}{3} + \frac{3}{4} + \frac{5}{6} =$

- (A) $1\frac{5}{12}$ (B) $1\frac{7}{12}$
 (C) $1\frac{9}{12}$ (D) $1\frac{11}{12}$

7. Asri completed $\frac{1}{5}$ of his assessment on Monday and $\frac{3}{4}$ of it on Tuesday. How much of his assessment did Asri complete in the two days ?

- (A) 1 (B) $\frac{4}{9}$
 (C) $\frac{3}{20}$ (D) $\frac{19}{20}$

8. $7\frac{3}{4} + 4\frac{3}{4} - 4\frac{3}{5} =$

- (A) $7\frac{18}{20}$ (B) $7\frac{8}{20}$
 (C) $7\frac{4}{20}$ (D) $7\frac{3}{20}$

9. A rope, $36\frac{1}{3}$ m long, was cut into three parts measuring $12\frac{2}{5}$ m, $13\frac{1}{2}$ m and $5\frac{4}{15}$ m respectively. What was the length of rope left ?

- (A) $5\frac{1}{6}$ (B) $7\frac{2}{5}$
 (C) $9\frac{1}{6}$ (D) $11\frac{2}{5}$

10. $3\frac{1}{5} \times \frac{5}{8} =$
 (A) $\frac{1}{8}$ (B) $\frac{1}{5}$
 (C) $\frac{1}{2}$ (D) 2
11. Anu had Rs. 150. She gave $\frac{3}{5}$ of this to Rajani. Rajani gave $\frac{1}{2}$ of the money she received to Narmada. How much did Narmada receive if she also received $\frac{1}{2}$ of the money that Anu had left?
 (A) Rs. 90 (B) Rs. 80
 (C) Rs. 75 (D) Rs. 45
12. $30 - \left(\frac{2}{7} \div \frac{2}{21}\right) =$
 (A) 312 (B) $29\frac{143}{147}$
 (C) 28 (D) 27
13. $\left(\frac{1}{5} \div \frac{1}{10}\right) \times \frac{1}{18} =$
 (A) 9 (B) 7
 (C) $\frac{1}{5}$ (D) $\frac{1}{9}$
14. $\left(\frac{3}{4} + \frac{5}{8}\right) \div \frac{1}{16} =$
 (A) 22 (B) 20
 (C) $\frac{1}{20}$ (D) $\frac{1}{22}$
15. $7\frac{2}{9} \div \left(\frac{1}{3} + \frac{5}{8}\right) =$
 (A) $22\frac{2}{9}$ (B) $9\frac{34}{54}$
 (C) $7\frac{37}{69}$ (D) $5\frac{1}{8}$

16. $10\frac{2}{7} \times \left(\frac{3}{4} + \frac{5}{8}\right) =$
 (A) $10\frac{1}{7}$ (B) $12\frac{1}{7}$
 (C) $14\frac{1}{7}$ (D) $16\frac{1}{7}$
17. In a class of 50 students, $\frac{2}{5}$ travel to school by bus, 10 travel by car and the rest walk. What is the fraction of students who walk to school?
 (A) $\frac{1}{5}$ (B) $\frac{2}{5}$
 (C) $\frac{3}{5}$ (D) $\frac{4}{5}$
18. $4\frac{1}{9} - \frac{1}{9} + 3\frac{1}{3} =$
 (A) $3\frac{2}{3}$ (B) $2\frac{2}{3}$
 (C) $1\frac{2}{3}$ (D) $\frac{2}{3}$
19. In a class of 50 students, 15 are girls. 5 of the girls and $\frac{2}{7}$ of the boys were chosen to represent their class in a game. The total number of students chosen is
 (A) 12 (B) 15
 (C) 19 (D) 25
20. $\frac{3}{8} \div \left(\frac{5}{3} - \frac{1}{6}\right) =$
 (A) $\frac{1}{4}$ (B) $\frac{1}{5}$
 (C) $\frac{2}{7}$ (D) $\frac{6}{7}$

21. Ahmed gave muthu Rs. 450. If $\frac{1}{9}$ and $\frac{2}{5}$ of the money was spent on clothes and food respectively, how much money does Muthu have left?
 (A) Rs. 250 (B) Rs. 240
 (C) Rs. 230 (D) Rs. 220
22. $3\frac{2}{5} + 1\frac{5}{6} - \frac{1}{5} =$
 (A) $5\frac{3}{19}$ (B) $5\frac{5}{19}$
 (C) $5\frac{1}{30}$ (D) $6\frac{1}{30}$
23. A class has 40 students. Every student contributed Rs. 2.50 to the class fund. $\frac{3}{10}$ of the total fund was used by the class to buy prizes for a Mathematics quiz. How much money does the class fund have left?
 (A) Rs. 30 (B) Rs. 50
 (C) Rs. 70 (D) Rs. 90
24. $\frac{5}{18} \div \left(\frac{2}{3} - \frac{1}{6}\right) =$
 (A) $\frac{4}{9}$ (B) $\frac{5}{9}$
 (C) $\frac{7}{9}$ (D) $\frac{8}{9}$
25. $\left(7\frac{1}{2} - 3\frac{2}{3}\right) \times \frac{12}{69} =$
 (A) $\frac{1}{3}$ (B) $\frac{2}{3}$
 (C) $1\frac{1}{3}$ (D) $2\frac{2}{3}$

PARAGRAPH TYPE

PASSAGE # 1

A given fraction is expressed in simplest form by dividing the numerator and denominator by their H.C.F. except 1.

26. $\frac{72}{27}$ is reduced to
 (A) $\frac{3}{8}$ (B) $\frac{18}{13}$
 (C) $\frac{8}{3}$ (D) Cannot reduce
27. Which fraction is not in its simplest form?
 (A) $\frac{56}{70}$ (B) $\frac{24}{67}$
 (C) $\frac{15}{19}$ (D) $\frac{63}{17}$
28. What fraction of 2 metres is 50 cm?
 (A) $\frac{1}{4}$ (B) $\frac{4}{25}$
 (C) $\frac{2}{5}$ (D) $\frac{1}{5}$

PASSAGE # 2

Akshara walked for $\frac{10}{20}$ km on Monday, $\frac{15}{20}$ km on Tuesday and $\frac{13}{20}$ km on Friday.

29. How much total did she walk on three days?
 (A) $2\frac{18}{20}$ km (B) $\frac{9}{10}$ km
 (C) $1\frac{9}{10}$ km (D) $1\frac{8}{20}$ km

30. How much more did she walk on Tuesday than on Monday?

- (A) $\frac{15}{20}$ km (B) $\frac{1}{4}$ km
 (C) $\frac{3}{20}$ km (D) $\frac{5}{10}$ km

31. On which day did she walk longer ?

- (A) Monday (B) Tuesday
 (C) Wednesday (D) Friday

MATCH THE COLUMN

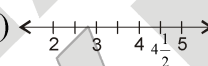
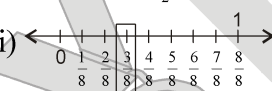

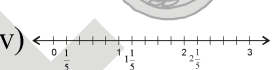
In this section each question has two matching lists. Choices for the correct combination of elements from Column-I and Column-II are given as options (A), (B), (C) and (D) out of which one is correct.

32. Match the following.

Column-I

- (P) $\frac{5}{4}$
 (Q) $\frac{3}{8}$
 (R) $2\frac{1}{5}$
 (S) $\frac{9}{2}$


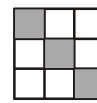
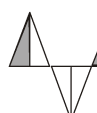

Column-II

- (i) 
 (ii) 
 (iii) 
 (iv) 

- (A) P → ii, Q → iii, R → iv, S → i
 (B) P → iii, Q → iv, R → i, S → ii
 (C) P → iii, Q → ii, R → iv, S → i
 (D) P → i, Q → ii, R → iii, S → iv

33. Match the following.

Column-I

- (P) 
 (Q) 
 (R) 
 (S) 

Column-II

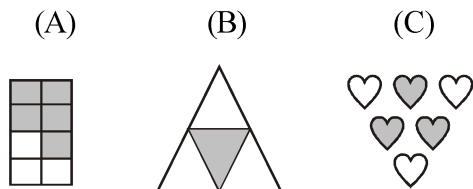
- (i) $\frac{2}{9} + \frac{1}{9}$
 (ii) $\frac{6}{8} - \frac{3}{8}$
 (iii) $1 - \frac{3}{8}$
 (iv) $\frac{5}{4} - \frac{3}{4}$

- (A) P → iv, Q → i, R → ii, S → iii
 (B) P → i, Q → ii, R → iii, S → iv
 (C) P → iv, Q → ii, R → i, S → iii
 (D) P → iv, Q → i, R → iii, S → ii

EXERCISE – II

VERY SHORT ANSWER TYPE

1. What fraction is represented by the shaded parts in each of the diagrams below ?



2. $\frac{6}{11} = \frac{a}{33} = \frac{36}{b}$

Determine the values of 'a' and 'b'.

3. Are the following fractions equivalent ?

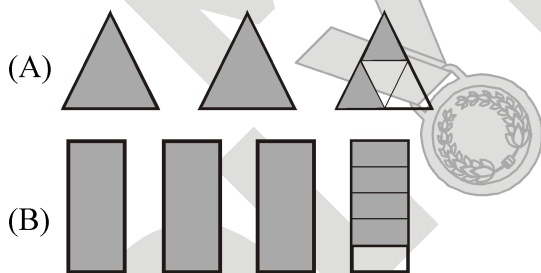
(A) $\frac{1}{5}, \frac{5}{25}$

(B) $\frac{3}{8}, \frac{10}{16}$

4. Which fraction is smaller ? $\frac{3}{5}$ or $\frac{4}{7}$

5. Arrange $\frac{1}{2}, \frac{8}{9}, \frac{5}{6}$ in ascending order.

6. Write the mixed fraction that represents the shaded parts.



7. From these fractions:

$\frac{3}{5}, \frac{5}{9}, \frac{11}{2}, \frac{9}{16}, \frac{7}{3}, \frac{6}{5}, \frac{101}{10}, \frac{22}{23}, \frac{4}{3}, \frac{9}{4}$

Select the

- (A) proper fractions
(B) improper fractions.

8. Convert the following improper fractions into mixed fractions.

(A) $\frac{19}{5}$

(B) $\frac{30}{6}$

9. Calculate $\frac{15}{25} + \frac{5}{25}$

10. Write additive inverse of $\frac{1}{3}$?

SHORT ANSWER TYPE

1. Solve $5\frac{1}{3} + 4\frac{2}{5}$

2. An oil tank contains $30\frac{2}{5}$ litres of oil. It is then filled with $37\frac{2}{3}$ litres of oil. Later, $56\frac{1}{9}$ litres of oil is pumped out from the tank. What is the volume of oil left in the tank now, in litres?

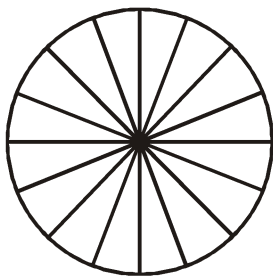
3. Anandini complete $\frac{1}{6}$ of her project in $3\frac{1}{2}$ days. How long would she take to complete the whole project?

4. There are 1,500 Americans working in a factory. The number of Chinese workers is $\frac{3}{5}$ the number of American workers and the number of Indian workers is $\frac{5}{9}$ the number of Chinese workers. How many workers are working in the factory ?

5. A fruit vendor had 1 dozen apples. He sold 7 apples. Find the fraction of the apples sold and apples not sold out of the total number of apples and the fraction of unsold apples to sold apples.

LONG ANSWER TYPE

- The diagram below shows a circle which is divided into 16 equal parts. Unshade $\frac{5}{8}$ of the whole circle.



- A work shift for an employee at Mc Donald’s consists of 8 hours. What fraction of the employee’s work shift is represented by 6 hours ?
- There are 35 students in a biology class. If 10 students made grade A in the first test, what fraction of the students made grade A?
- There are 100 centimeters in 1 meter. What fraction of a meter is 20 centimeters?
- An estimate for an adult’s waist measurement is found by dividing the neck size (in inches) by $\frac{1}{2}$. Revanth’s neck measures 18 inches. Estimate his waist measurement.

FILL IN THE BLANKS

- In an improper fraction, the denominator is ____ or ____ then numerator.
- Value of all ____ fractions are less than 1.
- A part of a whole is called ____.
- The missing number in $\frac{3}{5} = \frac{12}{\square}$ is ____.
- A fraction with numerator 1 is called ____.

TRUE / FALSE TYPE

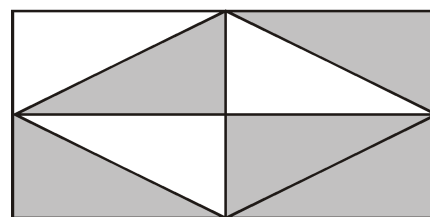
- $\frac{5}{6}$ is greater than $\frac{2}{3}$.
- In proper fractions, the numerator should be greater than the denominator.
- To add mixed fraction change the fractions to improper fractions.
- The fraction of 12 months and a year is $\frac{12}{12}$.
- Adding $4\frac{1}{3}$ and $6\frac{1}{8}$ we get $10\frac{1}{8}$.

INTEGERS TYPE QUESTIONS

In this section, each question, when worked out will result in one integer from 0 to 9 (both inclusive).

- By which number should numerator and denominator be multiplied to make fractions $\frac{3}{8}$ equivalent to $\frac{9}{24}$?

- What is the missing number in $\frac{\square}{15} - \frac{4}{15} = \frac{5}{15}$?



- Find the denominator of shaded fraction.
- What should be the minimum value of fraction to make the fraction improper ?
- What is twice of the denominator in the fraction $\frac{5}{3}$?

Answer Key

EXERCISE-I

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
A	C	A	B	C	D	D	A	A	D	C	D	D	A	C
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
C	B	A	B	A	D	C	C	B	B	C	A	A	C	B
31	32	33												
B	C	A												

EXERCISE – II

VERY SHORT ANSWER TYPE

1. (a) $\frac{5}{8}$ (b) $\frac{1}{4}$ (c) $\frac{1}{2}$

2. a = 18, b = 66

3. (a) Equivalent (b) Not Equivalent

4. $\frac{4}{7}$

5. $\frac{1}{5}, \frac{5}{6}, \frac{8}{9}$

6. (a) $2\frac{1}{2}$ (b) $3\frac{4}{5}$

7. (a) $\frac{3}{5}, \frac{5}{9}, \frac{9}{16}, \frac{22}{23}$ (b) $\frac{11}{2}, \frac{7}{3}, \frac{6}{5}, \frac{101}{10}, \frac{4}{3}, \frac{9}{4}$

8. (a) $3\frac{4}{5}$ (b) 5

9. $\frac{4}{5}$

10. $-\frac{1}{3}$

SHORT ANSWER TYPE

1. $9\frac{11}{15}$

2. $11\frac{43}{45}$

3. 21 days

4. 2,900

5. $\frac{7}{12}, \frac{5}{12}, \frac{5}{7}$

LONG ANSWER TYPE

2. $\frac{3}{4}$

3. $\frac{2}{7}$

4. $\frac{1}{5}$

5. 36 inches

FILL IN THE BLANKS

1. Equal, smaller

2. Proper

3. Fraction

4. 20

5. Unit fraction

TRUE / FALSE

1. T

2. F

3. T

4. T

5. F

INTEGER TYPE QUESTIONS

1. 3

2. 9

3. 8

4. 1

5. 6

SELF PROGRESS ASSESSMENT FRAMEWORK

(CHAPTER : FRACTIONS)

CONTENT	STATUS	DATE OF COMPLETION	SELF SIGNATURE
Theory			
In-Text Examples			
Solved Examples			
NCERT Exercises			
Exercise I			
Exercise II			
Short Note-1			
Revision - 1			
Revision - 2			
Revision - 3			
Remark			

NOTES :

1. In the status, put “completed” only when you have thoroughly worked through this particular section.
2. Always remember to put down the date of completion correctly. It will help you in future at the time of revision.



Space for Notes :

A large rectangular area filled with horizontal dotted lines, intended for writing notes.



DATA HANDLING

(DATA HANDLING AND PRESENTATION)

3

Concepts

Introduction

1. *Observation*
2. *Frequency*
3. *Tally marks*
4. *Organisation of data*
5. *Pictograph*
 - 5.1 *Reading and interpretation of pictograph*
 - 5.2 *Representation of pictograph*
6. *Bar graph*
 - 6.1 *Reading and interpretation of bar graph*
 - 6.2 *Representation or construction of bar graphs*

Solved Examples

NCERT Solutions

Exercise - I (SCQ Type)

Exercise - II (Board Pattern Type)

Answer Key

INTRODUCTION

Data is a set of collection of numbers or values of a particular information. There are three types of data:

Raw Data, Primary Data and Secondary Data.

Let us consider the marks of 15 students of class VI in a unit test. 48, 40, 45, 38, 24, 34, 42, 35, 30, 20, 21, 29, 09, 25, 44

Data presented in such a form is called Raw Data. This data do not has a specific arrangement. If data collected by a person himself for his own use, then it is called Primary Data.

A data which is collected by someone else and used by the investigator for his own use is called Secondary Data. For example, data collected from sources like internet, newspapers, magazines is secondary data.

1. OBSERVATION

Each entry in a given data is called an observation.

2. FREQUENCY

The number of times a particular observation occurs in the given set of data, is called its frequency.

3. TALLY MARKS

A tally mark is the symbolic representation of occurrence of an observation in a particular table. The symbol used is ‘|’.

Note : If the observation has frequency 5, then the tally marks are represented as ||||| .

4. ORGANISATION OF DATA

After collection of data, it needs to be recorded and organised in a tabular form. Let us learn it with the help of given illustrations.

Example 1

Given below is the marks obtained by 30 students in a unit test of class VI, out of 50.

32, 48, 40, 31, 40, 32, 25, 42, 39, 15, 48, 32, 25, 22, 32

25, 19, 31, 48, 32, 42, 15, 25, 19, 32, 31, 25, 48, 22, 15

Represent the data in a tabular form using tally marks.

Solution :

Marks obtained	Tally marks	No. of students
15		3
19		2
22		2
25		5
31		3
32		6
39		1
40		2
42		2
48		4
Total		30

5. PICTOGRAPH






Pictograph is a way of representing data by using figures or pictures.

5.1 READING AND INTERPRETATION OF PICTOGRAPH

For interpreting a pictograph we need first to read the graph. Let us understand it with the help of given illustrations.

Example 2

The pictograph given below shows the number of bicycles made by a factory during the four weeks of a month. Study the pictograph and answer the following questions.

Weeks	Number of bicycles
1 st	
2 nd	
3 rd	
4 th	
Each  represents 100 bicycles	

- (i) How many bicycles were made by the factory during 1st week ?
- (ii) What is the difference between the number of bicycles made during 3rd week and 4th week ?
- (iii) In which week maximum number of bicycles were made ?

Solution :

(i) Number of bicycles made during 1st week = $3 \times 100 = 300$

(ii) Number of bicycles made in 3rd week = $5 \times 100 = 500$

Number of bicycles made in 4th week = $3 \times 100 = 300$

Difference = $500 - 300 = 200$

(iii) Maximum number of bicycles were made in 3rd week of the month.

5.2 REPRESENTATION OF PICTOGRAPH

To draw or represent a pictograph we use pictures or symbols to indicate appropriate units.








Example 3

Prepare a pictograph for the given data that shows the pocket money of six children.

Name	Shivani	Pooja	Jyoti	Preeti	Jatin	Rohit
Money (in Rs.)	500	800	900	600	600	600

Solution :

The pictograph for the given data is shown below.

Name	Pocket money
Shivani	
Pooja	
Jyoti	
Preeti	
Jatin	
Rohit	
Each  represents Rs.100.	

6. BAR GRAPH

Bar graph is also a method of visual representation of data.

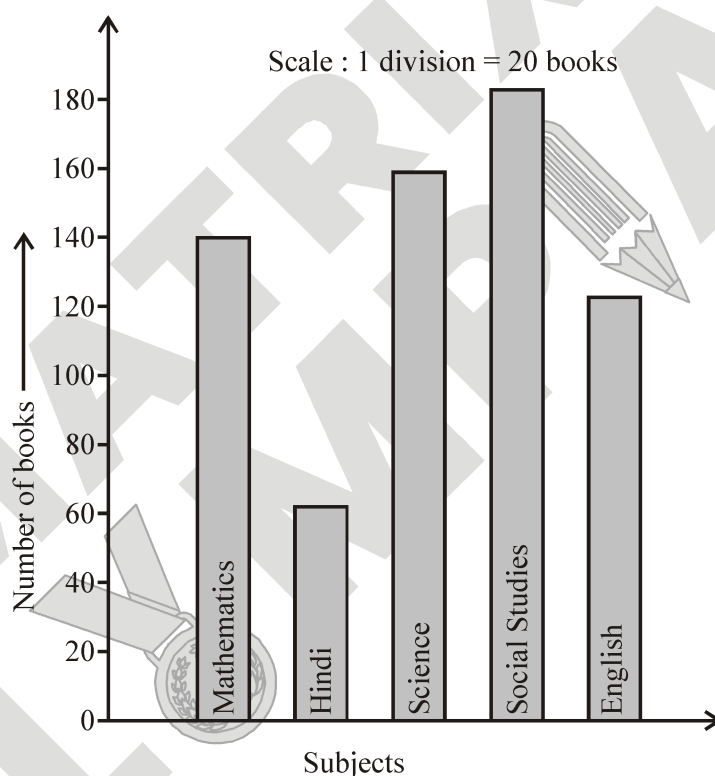
A bar graph is a representation of data using bars (rectangles) erected horizontally or vertically of uniform width with equal spacing between them.

6.1 READING AND INTERPRETATION OF BAR GRAPH

Let us learn it with the help of illustrations.

Example 4

Given bar graph shows the number of books of different subjects kept in a library. Study it and answer the following questions.



- How many Hindi books are kept in the library ?
- Are number of books of Science more than that of Mathematics? If yes, then by how much?
- Which subject has maximum number of books in the library?

Solution :

- Number of Hindi books in the library = 60.
- Yes; number of books of Science are more than that of Mathematics by $160 - 140 = 20$ books.
- The maximum number of books in the library is of Social Studies.

6.2 REPRESENTATION OR CONSTRUCTION OF BAR GRAPHS

While constructing a bar graph, we have to follow the given steps.

Step 1 : On a graph paper, draw a horizontal line and a vertical line.

Step 2 : Mark points at equal distances along one line and write the names of the items for which data is to be represented along other line.

Step 3 : Choose a suitable scale and locate the heights of different bars according to scale.

Step 4 : Now, draw of equal width according to required height.

Example 5

Information given below represents the number of tourists visiting a zoo for 5 months.

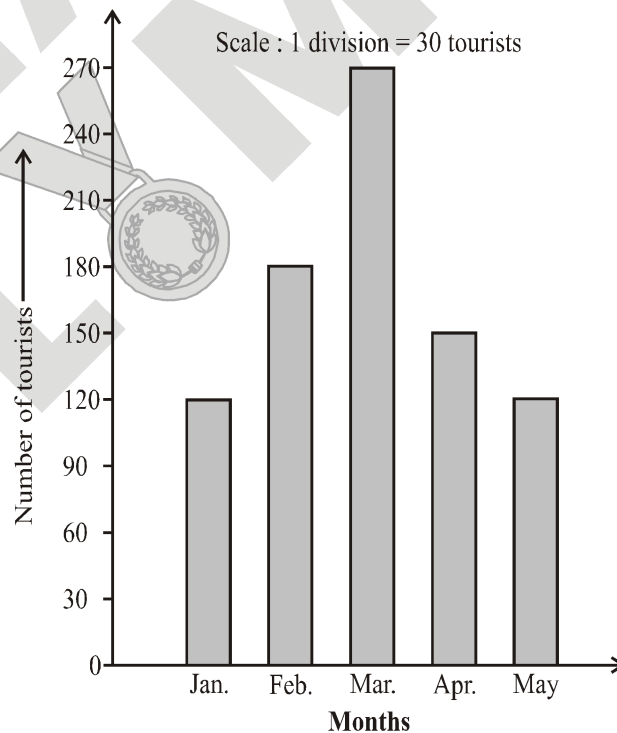
Months	January	February	March	April	May
Number of tourists	120	180	270	150	120

Make a bar graph representing the above information.

Solution :

We go through the following steps of construction to make bar graph.

1. We draw two lines perpendicular to each other on a graph sheet and call them horizontal and vertical lines.
2. Along horizontal line we mark “Months” and along vertical line mark “Number of tourists”.
3. Draw rectangular bars according to given information and scale chosen.





Focus Point

- Collection of numbers of an information is known as data.
- After collection of data it needs to be organised, presented and analysed properly to gather information.
- Representation of data in form of tables is done by using tally marks.
- Pictograph is a way of representing data by using pictures or figures.
- Bar graph is a pictorial representation of data by bars (rectangles) erected horizontally or vertically of uniform width with equal spacing between them.

MATRIX ACADEMY
OLYMPIAD



SOLVED EXAMPLES

SE. 1

In a survey of 20 families, each family is found to have the following number of children.

1, 2, 2, 3, 2, 3, 3, 4, 1, 1, 4, 4, 2, 2, 3, 1, 5, 1, 1, 2

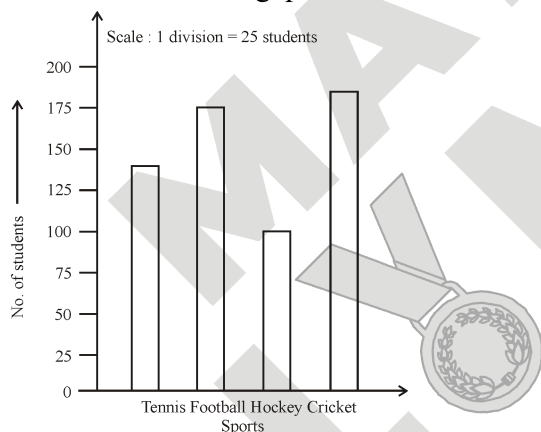
Represent the data in tabular form using tally marks.

No. of children	Tally marks	No. of families
1		6
2		6
3		4
4		3
5		1
Total		20

Ans.

SE. 2

The given bar graph shows the sports liked by the students of a school. Study the bar graph and answer the following questions.



- (i) Which is the most popular sport?
- (ii) Which sport is preferred least?
- (iii) What is the difference between number of students playing football and hockey?

Ans.

- (i) Most popular sport is cricket.
- (ii) Hockey is preferred least.
- (iii) Number of students playing football = 175
Number of students playing hockey = 100
 \therefore Difference = $175 - 100 = 75$

SE. 3

The sale of number of dolls on different days of a week in a shopping mall is shown below:

Days	Number of dolls
Monday	
Tuesday	
Wednesday	
Thursday	
Friday	
Saturday	
Sunday	

Each represents 20 dolls

Observe the pictograph and answer the following questions.










- (i) How many dolls were sold on Tuesday?
- (ii) On which day maximum number of dolls were sold?
- (iii) Find the total number of dolls sold in first three days of the week.

Ans.

- (i) Number of dolls sold on Tuesday = $8 \times 20 = 160$
- (ii) On Sunday, maximum number of dolls were sold.
- (iii) Number of dolls sold on Monday = $6 \times 20 = 120$
Number of dolls sold on Tuesday = $8 \times 20 = 160$
Number of dolls sold on Wednesday = $4 \times 20 = 80$
 \therefore Total number of dolls sold in first three days of the week = $120 + 160 + 80 = 360$

SE. 4

The number of benches in each class of a school is depicted by the pictograph.

Classes	Number of benches
I	
II	
III	
IV	
V	
VI	
VII	
VIII	
Each  represents 4 benches	

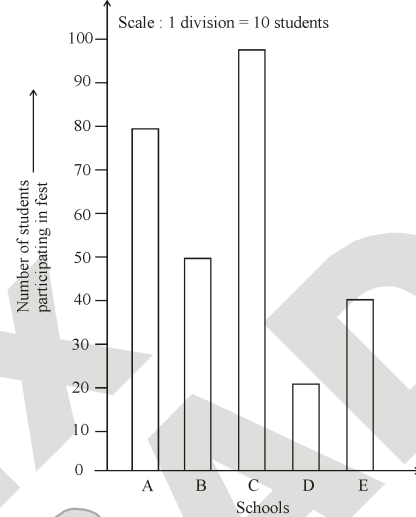
Observe the pictograph and answer the following questions.

- (i) How many benches are there in class VI?
 - (ii) Which class has maximum number of benches?
- Also, find the number of benches in that class.
- (iii) Which class has least number of benches?

Ans. (i) Number of benches in class VI = $4 \times 4 = 16$.
 (ii) Class I has maximum number of benches i.e., $4 \times 6 = 24$ benches.
 (iii) Class VIII has least number of benches.

SE. 5

Read the bar graph carefully and answer the following questions.



- (i) What is the information given by the bar graph?
- (ii) How many students of school B participated in the fest?
- (iii) From which school maximum number of students participated?
- (iv) What is the difference between the maximum and minimum number of students?

Ans. (i) Bar graph shows the number of students of different schools participating in a fest.
 (ii) 50 students of school B participated in the fest.
 (iii) Maximum number of students participated from school C.
 (iv) Maximum number of students = 100
 Minimum number of students = 20
 \therefore Difference = $100 - 20 = 80$

SE. 6

In a village, fruit sellers sold the following number of watermelons in a particular week.

Name	Number of Watermelons sold
Sohan	
Shyamlal	
Ramu	
Ranjit	
Suresh	
Each represents 10 watermelons	

Observe the pictograph and answer the following questions.

- (i) Which fruit seller sold the minimum number of watermelons?
- (ii) How many watermelons were sold by Suresh?
- (iii) The sellers who have sold 60 or more number of watermelons are planning to buy a godown for the next season. Can you name them?

- Ans.**
- (i) Minimum number of watermelons were sold by Sohan.
 - (ii) Number of watermelons sold by Suresh = $8 \times 10 = 80$.
 - (iii) Ramu, Ranjit and Suresh sold 60 or more number of watermelons.

SE. 7

The weights (in kg) of 22 students of a class are given below.

44, 46, 42, 40, 44, 44, 46, 43, 43, 44, 42, 46, 44, 43, 43, 42, 40, 40, 44, 46, 46, 44

Represent the data in tabular form using tally marks.

Ans.

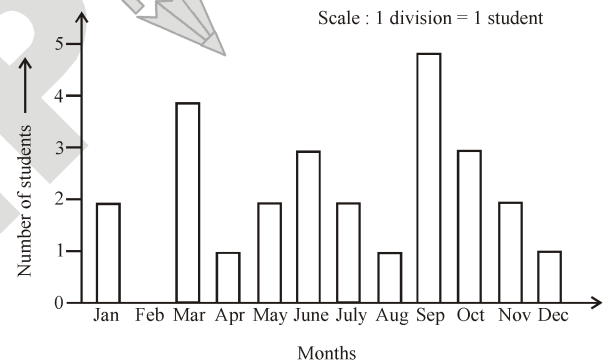
Weight (in kg)	Tally marks	Frequency
40		3
42		3
43		4
44		7
46		5
Total		22

SE. 8

The following data shows the number of students born in different months of a particular year of class VI. Make the bar graph based on the given information.

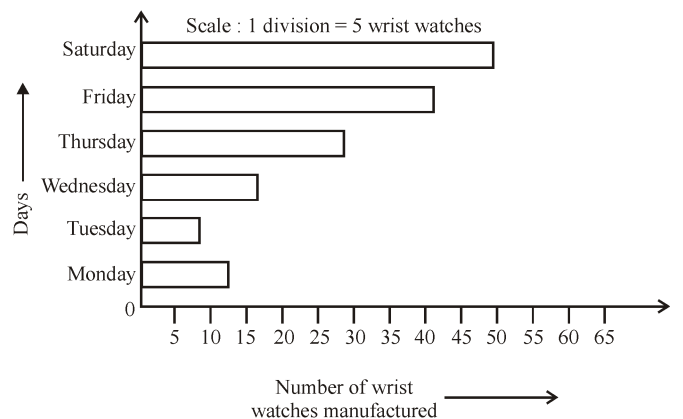
Months	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
Number of students born	2	0	4	1	2	3	2	1	5	3	2	1

Ans.



SE. 9

Number of wrist watches manufactured by a factory in six days of a particular week is given below.



Read the bar graph and answer the following questions.

- (i) What information does the bar graph gives?
- (ii) On which day, the maximum number of wrist watches were manufactured? How many wrist watches were manufactured on that day?
- (iii) On which day, the minimum number of wrist watches were manufactured ?
- (iv) How many wrist watches were manufactured on Thursday ?

Ans. (i) Bar graph shows the number of wrist watches manufactured by a factory in six days of a particular week.

(ii) Maximum number of wrist watches were manufactured on Saturday.

Number of wrist watches manufactured on Saturday = 60

(iii) Minimum number of wrist watches were manufactured on Tuesday.

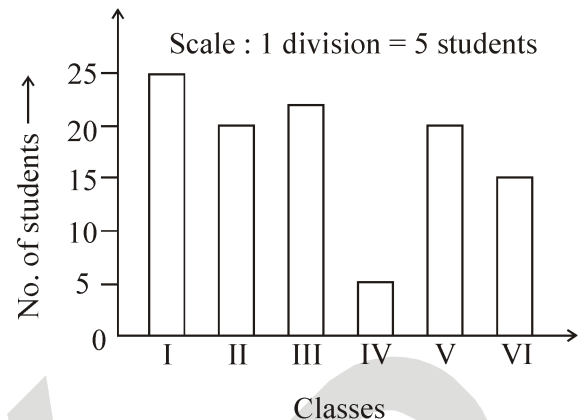
(iv) Number of wrist watches manufactured on Thursday = 35

SE. 10

Draw the bar graph for the given data.

Classes	Number of students going to picnic
I	25
II	20
III	23
IV	5
V	20
VI	15

Ans.



SE. 11

The given pictograph represents the number of students in 5 sections of Class VI.

Section	Number of students
A	6 smiley faces
B	8 smiley faces
C	7 smiley faces
D	9 smiley faces
E	7 smiley faces
Each ☺ represents 6 students	

Study the given pictograph and answer the following questions.

- (i) How many students are there in section E?
- (ii) Find the total number of students in 5 sections of Class VI.
- (iii) How many less students are there in section E than section D?
- (iv) Which section has 48 students?
- (v) Find the difference between the number of students in section E and the total number of students in section C and D altogether.

Ans. (i) Number of students in section E = $6 \times 7 = 42$
 (ii) Total number of students = $38 \times 6 = 228$
 (iii) Number of students in section D = $9 \times 6 = 54$

Number of students in section E = $7 \times 6 = 42$

Difference = $54 \times 42 = 12$.

(iv) Section B and C has 48 students.

(v) Number of students in section E = 42

Total number of students in section C and D altogether = $8 \times 6 + 9 \times 6 = 48 + 54 = 102$

Difference = $102 - 42 = 60$.






SE. 12

In a school library, there are books on the following subjects: English = 500, History = 700, Maths = 800, Science = 900.

Draw the pictograph for the above numerical data and answer the following questions.

- (i) How many books are there in the school library?
- (ii) Which subjects have maximum and minimum number of books?

Ans.

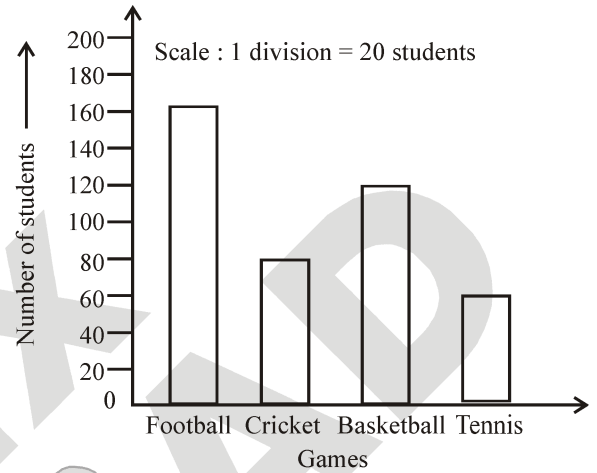
Subject	Number of books
English	
History	
Maths	
Science	
Each  represents 100 books	

(i) Total number of books = $29 \times 100 = 2900$

(ii) Science has maximum number of books and English has minimum number of books.

SE. 13

Read the given bar graph, showing the number of games played by different number of students of a school.



On the basis of given graph, answer the following questions.

- (i) Which game is played by the maximum number of students?
- (ii) Which game is played by the minimum number of students?
- (iii) Which game is played by only 120 students?
- (iv) How many students play Cricket and Tennis together?

Ans.

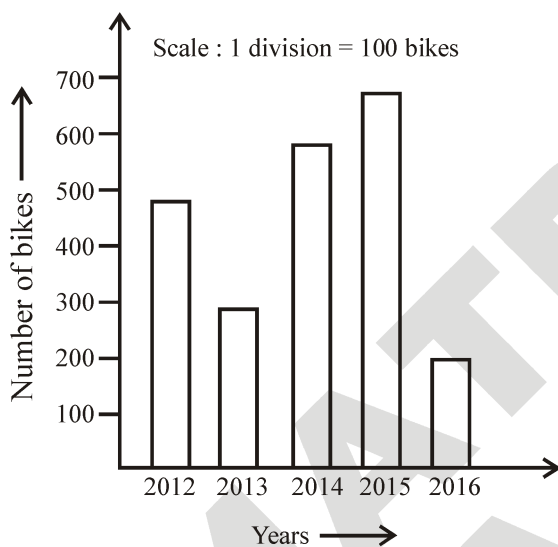
- (i) Football is played by the maximum number of students.
- (ii) Tennis is played by the minimum number of students.
- (iii) Basketball is played by 120 students.
- (iv) Number of students played Cricket = 80
Number of students played Tennis = 60
Total number of students played Cricket and Tennis = $80 + 60 = 140$

SE. 14

Draw a bar graph using the data given in the following table, which shows the number of bikes manufactured in a factory during the years 2012 to 2016.

Years	2012	2013	2014	2015	2016
Number of bikes	500	300	600	700	200

Ans.

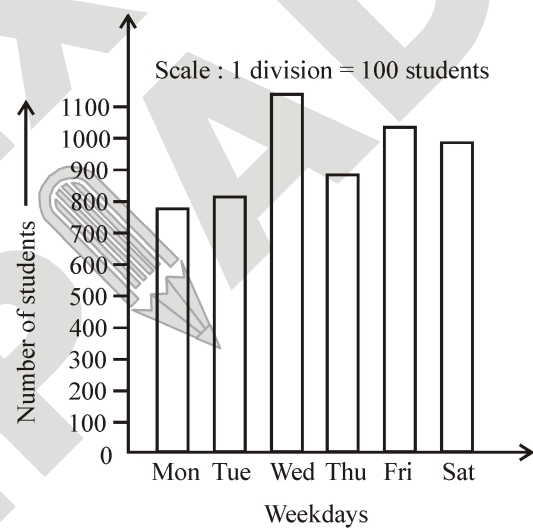


SE. 15

The following data shows the number of students who attended the school on weekdays. Draw a bar graph to represent information by using appropriate scale.

Days	Mon	Tue	Wed	Thu	Fri	Sat
Number of Student	750	800	1100	850	1000	950

Ans.



EXERCISE 9.1

NS. 1

In a Mathematics test, the following marks were obtained by 40 students. Arrange these marks in a table using tally marks.

8	1	3	7	6	5	5	4	4	2
4	9	5	3	7	1	6	5	2	7
7	3	8	4	2	8	9	5	8	6
7	4	5	6	9	6	4	4	6	6

(a) Find how many students obtained marks equal to or more than 7.

(b) How many students obtained marks below 4?

Ans.

Marks	Tally Marks	No. of students
1		2
2		3
3		3
4		7
5		6
6		7
7		5
8		4
9		3

(a) $5 + 4 + 3 = 12$ students obtained marks equal to or more than 7.

(b) $2 + 3 + 3 = 8$ students obtained marks below 4.

NS. 2

Following is the choice of sweets of 30 students of Class VI.

Ladoo, Barfi, Ladoo, Jalebi, Ladoo, Rasgulla, Jalebi, Ladoo, Barfi, Rasgulla, Ladoo, Jalebi, Jalebi, Rasgulla, Ladoo, Rasgulla, Jalebi, Ladoo, Rasgulla, Ladoo, Ladoo, Barfi, Rasgulla, Rasgulla, Jalebi, Rasgulla, Ladoo, Rasgulla, Jalebi, Ladoo.

(a) Arrange the names of sweets in a table using tally marks.

(b) Which sweet is preferred by most of the students?

Ans.

(a)

Name of Sweets	Tally Marks	No. of students
Ladoo		11
Barfi		3
Jalebi		7
Rasgulla		9

(b) Ladoo is preferred by most of the students.

NS. 3

Catherine threw a dice 40 times and noted the number appearing each time as shown below:

1	3	5	6	6	3	5	4	1	6
2	5	3	4	6	1	5	5	6	1
1	2	2	3	5	2	4	5	5	6
5	1	6	2	3	5	2	4	1	5

Make a table and enter the data using tally marks.

Find the number that appeared

(a) The minimum number of times.

(b) The maximum number, of times.

(c) Find those numbers that appear an equal number of times.

Ans.

Numbers	Tally Marks	No. of appearance
1		7
2		6
3		5
4		4
5		11
6		7

- (a) 4 appeared minimum number of times.
- (b) 5 appeared maximum number of times.
- (c) 1 and 6 appeared equal number of times.

NS. 4

Following pictograph shows the number of tractors, in five villages.

Villages	Number of tractors - 1 Tractor
Villages A	
Villages B	
Villages C	
Villages D	
Villages E	

Observe the pictograph and answer the following questions.

- (i) Which village has the minimum number of tractors?
- (ii) Which village has the maximum number of tractors?
- (iii) How many more tractors village C has as compared to village B.
- (iv) What is the total number of tractors in all the five villages?

- Ans.**
- (i) Village D has the minimum number of tractors.
 - (ii) Village C has the maximum number of tractors.
 - (iii) Village C has $8 - 4 = 4$ more tractors than village B.
 - (iv) Total number of tractors = $5 + 4 + 8 + 3 + 5 = 25$

NS. 5

The number of girl students in each class of a co-educational middle school is depicted by the pictograph :

Classes	Number of girl students - 4 Girls
I	
II	
III	
IV	
V	
VI	
VII	
VIII	

Observe this pictograph and answer the following questions :

- (a) Which class has the minimum number of girl students?
- (b) Is the number of girls in Class VI less than the number of girls in Class V?
- (c) How many girls are there in Class VII?

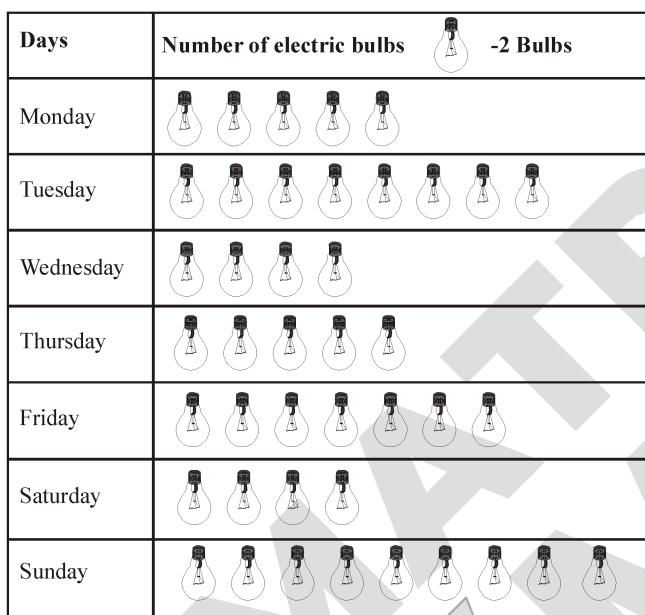
Classes	Number of girls students
I	$6 \times 4 = 24$
II	$4 \times 4 + 2 = 18$
III	$5 \times 4 = 20$
IV	$3 \times 4 + 2 = 14$
V	$2 \times 4 + 2 = 10$
VI	$4 \times 4 = 16$
VII	$3 \times 4 = 12$
VIII	$1 \times 4 + 2 = 6$
Total	120

Ans.

- (a) Class VIII has the minimum number of girl students.
- (b) No, the number of girls in Class VI is greater than the number of girls in Class V.
- (c) There are 12 girls in Class VII.

NS. 6

The sale of electric bulbs on different days of a week is shown below :



Observe the pictograph and answer the following questions :

- (a) How many bulbs were sold on Friday?
- (b) On which day were the maximum number of bulbs sold?
- (c) On which of the days same number of bulbs were sold?
- (d) On which of the days minimum number of bulbs were sold?
- (e) If one big carton can hold 9 bulbs. How many cartons were needed in the given week?

Ans.

Days	Number of bulbs
Monday	$6 \times 2 = 12$
Tuesday	$8 \times 2 = 16$
Wednesday	$4 \times 2 = 8$
Thursday	$5 \times 2 = 10$
Friday	$7 \times 2 = 14$
Saturday	$4 \times 2 = 8$
Sunday	$9 \times 2 = 18$
Total	86

- (a) Number of bulbs sold on Friday is 14.
- (b) Maximum number of bulbs were sold on Sunday.
- (c) Same number of bulbs were sold on Wednesday and Saturday.
- (d) Minimum number of bulbs were sold on Wednesday and Saturday.
- (e) The total number of bulbs were sold in the given week = 86








Number of cartons required for 9 bulbs = 1

$$\therefore \text{Number of cartons required for 86 bulbs} = 86 \div 9 = 9.55 \approx 10$$

Therefore, 10 cartons were needed in the given week.

NS. 7

In a village six fruit merchants sold the following number of fruit baskets in a particular season:

Name of fruit merchants	Number of fruit baskets	 - 100 Fruit baskets
Rahim		
Lakhanpal		
Anwar		
Martin		
Ranjit Singh		
Joseph		

Observe this pictograph and answer the following questions :

- (a) Which merchant sold the maximum number of baskets?
- (b) How many fruit baskets were sold by Anwar?
- (c) The merchants who have sold 600 or more number of baskets are planning to buy a godown for the next season. Can you name them ?

Ans.

Name of fruit Merchants	Number of fruit baskets
Rahim	$4 \times 100 = 400$
Lakhanpal	$5 \times 100 + 50 = 550$
Anwar	$7 \times 100 = 700$
Martin	$9 \times 100 + 50 = 950$
Ranjit Singh	$8 \times 100 = 800$
Joseph	$4 \times 100 + 50 = 450$
Total	3850

- (a) Martin sold the maximum number of baskets.
- (b) 700 fruit baskets were sold by Anwar.
- (c) Anwar, Martin and Ranjit Singh have sold more than 600 baskets.

EXERCISE 9.2

NS. 1

Total number of animals in five villages are as follows :


Village A : 80

Village B : 120

Village C : 90




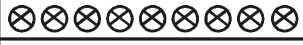


Village D : 40

Village E : 60

Prepare a pictograph of these animals using one symbol  to represent 10 animals and answer the following questions :

- (a) How many symbols represent animals of village E?
- (b) Which village has the maximum number of animals?
- (c) Which village has more animals : village A or village C ?

Ans.


Villages	Number of animals	 = 10 animals
Village A	80	
Village B	120	
Village C	90	
Village D	40	
Village E	60	

- (a) 6 symbols represent animals of village E.
- (b) Village B has the maximum number of animals.
- (c) Village C has more animals than village A.







NS. 2

Total number of students of a school in different years is shown in the following table.

Years	Number of students
1996	400
1998	535
2000	472
2002	600
2004	623







- A. Prepare a pictograph of students using one symbol  to represent 100 students and answer the following questions:
- (a) How many symbols represent total number of students in the year 2002?
- (b) How many symbols represent total number of students for the year 1998?
- B. Prepare another pictograph of students using any other symbol each representing 50 students. Which pictograph do you find more informative?

Ans. A.

Years	Numbers of students	 - 100 students
1996	400	
1998	535	
2000	472	
2002	600	
2004	623	

- (a) 6 symbols represent total number of students in the year 2002.
- (b) Five completed and one incomplete symbols represent total number of students for the year 1998.

B.

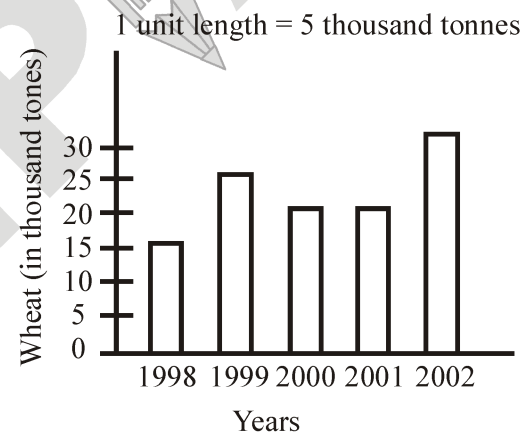
Years	Number of students	 = 50 students
1996	400	
1998	535	
2000	472	
2002	600	
2004	623	

Pictograph B is more informative than pictograph A.

EXERCISE 9.3

NS. 1

The given bar graph shows the amount of wheat purchased by government during the year 1998 – 2002.



Read the bar graph and write down your observations. In which year was

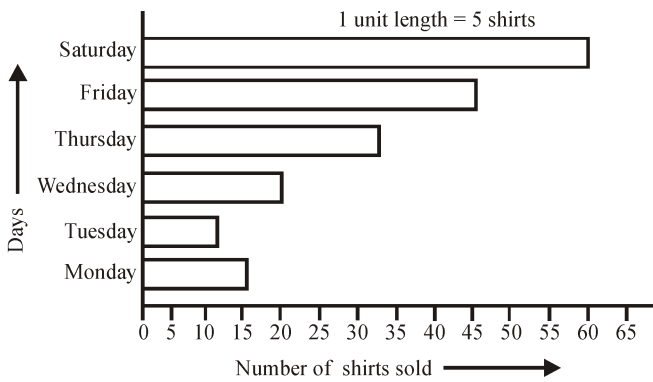
- (a) the wheat production maximum?
- (b) the wheat production minimum?

Ans.

- (a) In 2002, production of wheat was maximum.
- (b) In 1998, production of wheat was minimum.

NS. 2

Observe this bar graph which is showing the sale of shirts in a ready made shop from Monday to Saturday.



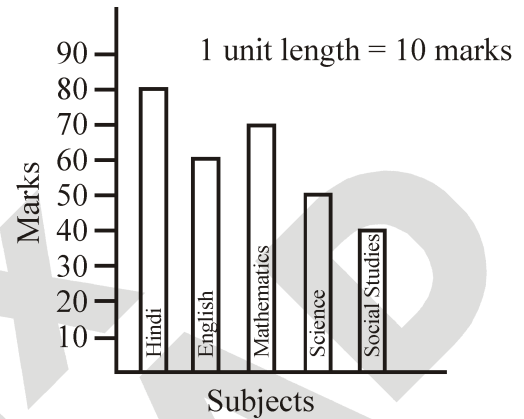
Now answer the following questions :

- (a) What information does the above bar graph give?
- (b) What is the scale chosen on the horizontal line representing number of shirts?
- (c) On which day were the maximum number of shirts sold? How many shirts were sold on that day?
- (d) On which day were the minimum number of shirts sold?
- (e) How many shirts were sold on Thursday?

- Ans.**
- (a) The bar graph shows the sale of shirts in a ready made shop from Monday to Saturday.
 - (b) 1 unit length = 5 shirts
 - (c) On Saturday, maximum number of shirts, i.e., 60 shirts were sold.
 - (d) On Tuesday, minimum number of shirts were sold.
 - (e) On Thursday, 35 shirts were sold.

NS. 3

Observe this bar graph which shows the marks obtained by Aziz in half-yearly examination in different subjects.



Answer the given questions.

- (a) What information does the bar graph give?
- (b) Name the subject in which Aziz scored maximum marks.
- (c) Name the subject in which he has scored minimum marks.
- (d) State the name of the subjects and marks obtained in each of them.

- Ans.**
- (a) The bar graph shows the marks obtained by Aziz in half-yearly examination in different subjects.
 - (b) Hindi
 - (c) Social Studies
 - (d) Hindi–80, English–60, Mathematics–70, Science–50, Social Studies–40.

EXERCISE 9.4

NS. 1

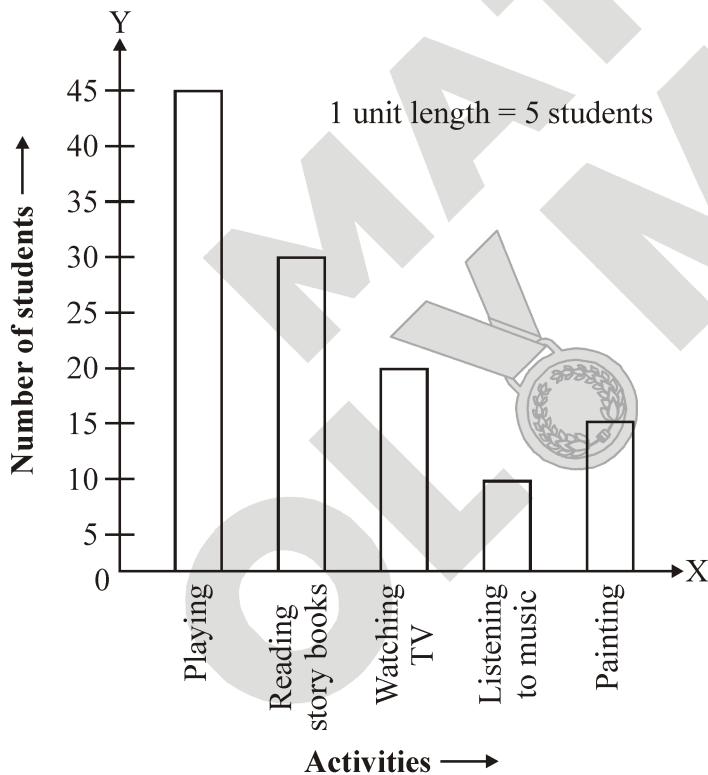
A survey of 120 school students was done to find which activity they prefer to do in their free time.

Preferred activity	Number of students
Playing	45
Reading story books	30
Watching TV	20
Listening to music	10
Painting	15

Draw a bar graph to illustrate the above data taking scale of 1 unit length = 5 students.

Which activity is preferred by most of the students other than playing ?

Ans.



Reading story books is preferred by most of the students other than playing.

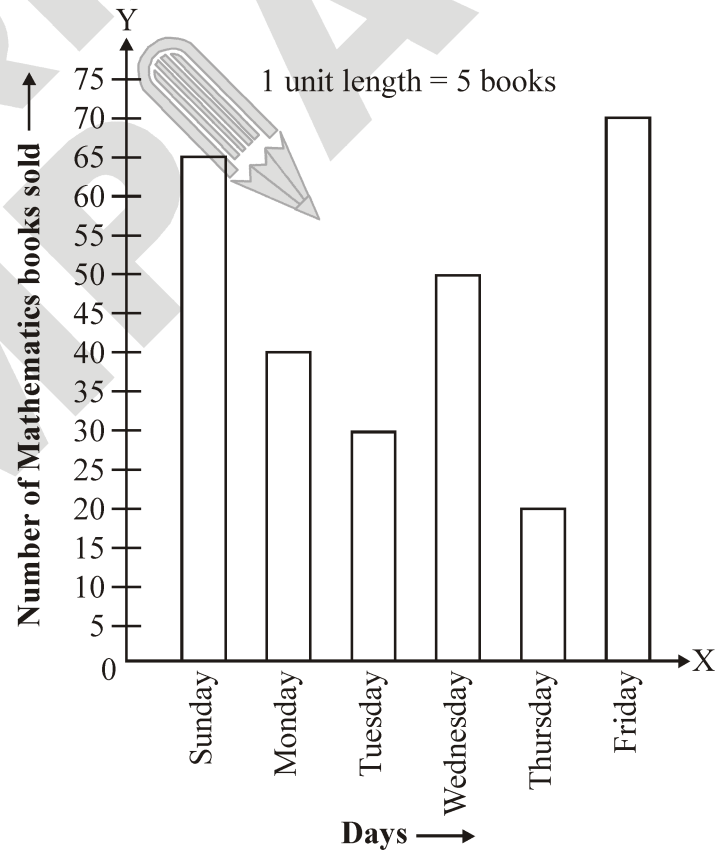
NS. 2

The number of Mathematics books sold by a shopkeeper on six consecutive days is shown below :

Days	Sun.	Mon.	Tues.	Wedn.	Thur.	Fri.
Number of books sold	65	40	30	50	20	70

Draw a bar graph to represent the above information choosing the scale of your choice.

Ans.



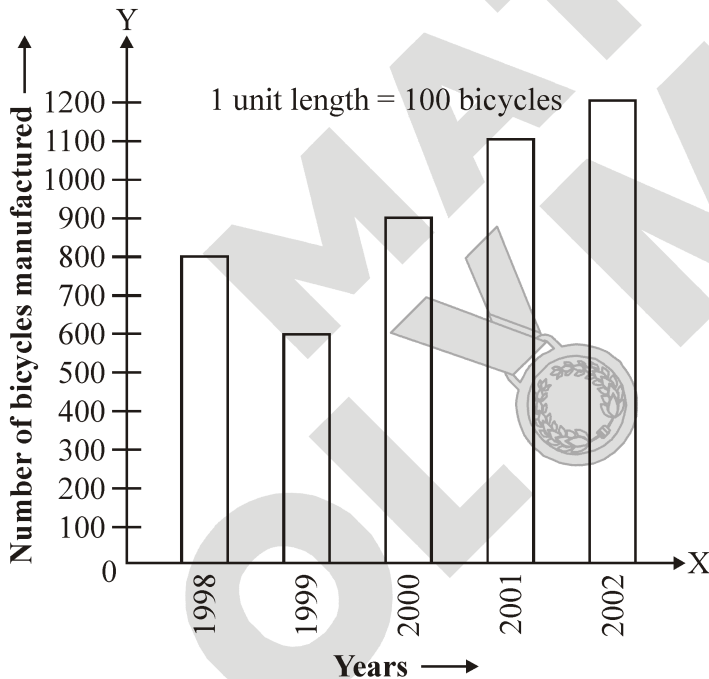
NS. 3

Following table shows the number of bicycles manufactured in a factory during the years 1998 to 2002. Illustrate this data using a bar graph. Choose a scale of your choice.

Years	Number of bicycles manufactured
1998	800
1999	600
2000	900
2001	1100
2002	1200

- (a) In which year were the maximum number of bicycles manufactured ?
- (b) In which year were the minimum number of bicycles manufactured ?

Ans.



- (a) In 2002, the maximum number of bicycles were manufactured.
- (b) In 1999, the minimum number of bicycles were manufactured.

NS. 4

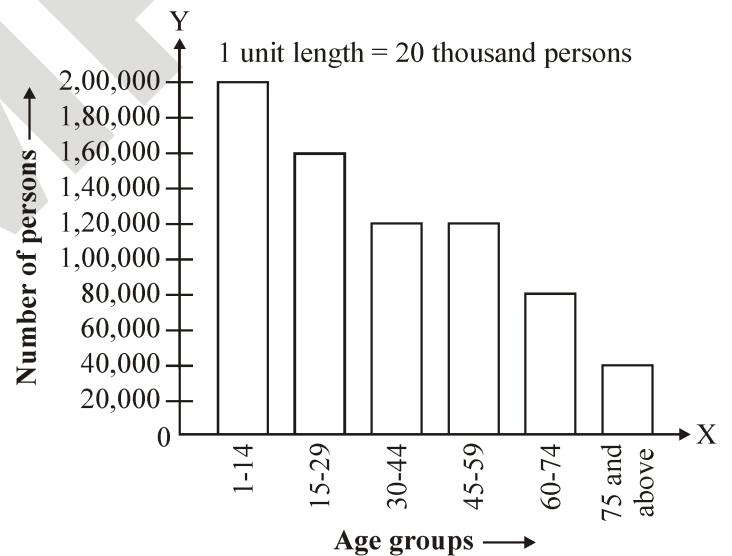
Number in various age groups in a town is given in the following table.

Age group	1-14	15-29	30-44	45-59	60-74	75 and above
Number of persons	2 lakhs	1 lakh 60 thou.	1 lakh 20 thou.	1 lakh 20 thou.	80 thou.	40 thou.

Draw a bar graph to represent the above information and answer the following questions, (take 1 unit length = 20 thousands)

- (a) Which two age groups have same population?
- (b) All persons in the age group of 60 and above are called senior citizens. How many senior citizens are there in the town ?

Ans.







- (a) Age groups 30 - 44 and 45 - 59 have same population.
- (b) $80,000 + 40,000 = 1,20,000$ senior citizens are there in the town.

EXERCISE – I

ONLY ONE CORRECT TYPE





- In the data 18, 13, 15, 13, 18, 14, 15, 13, 14, 15, how many times the number '15' repeats itself?
(A) 2 (B) 1
(C) 3 (D) 4
- Representation of data in tabular form is done by using _____.
(A) Bar graph
(B) Frequency
(C) Tally marks
(D) None of these
- In a survey of 12 families, each family is found to have the following number of children.
3, 1, 4, 1, 2, 2, 3, 1, 2, 2, 3, 3
Number of families with 2 children is equal to number of families with _____.
(A) 1 child (B) 3 children
(C) 4 children (D) None of these
- Data obtained in the original form is called _____.
(A) Bar graph (B) Raw data
(C) Pie chart (D) Observation
- The choices of the fruits of 42 students in a class are as follows:
A, O, B, M, A, G, B, G, A, G, B, M, A, G, M, A, B, G, M, B, A, O, M, O, G, B, O, M, G, A, A, B, M, O, M, G, B, A, M, O, M, O, where A, B, G, M and O stand for the fruits Apple, Banana, Grapes, Mango and Orange respectively. Which two fruits are liked by an equal number of students?
(A) A and M (B) M and B
(C) B and O (D) B and G

Direction (6–8) : Following is the pictograph of different kinds of trees in a garden.

Type of tree	Number of trees
Mango trees	
Coconut trees	
Banana trees	
Each  represents 10 trees.	

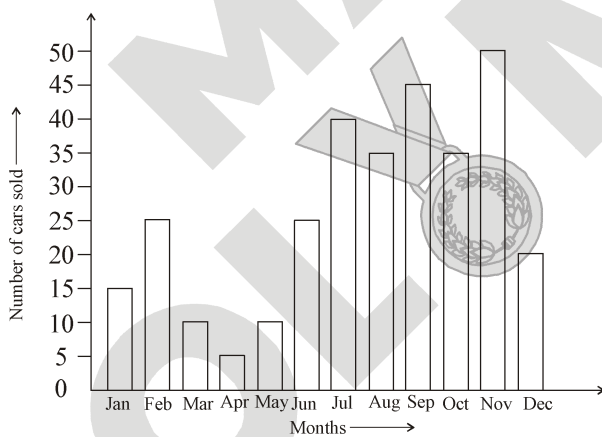
- Find the total number of trees in the garden.
(A) 120 (B) 140
(C) 130 (D) 150
- The number of mango trees is _____ times the number of banana trees.
(A) Ten (B) Two
(C) Four (D) Three
- What is the difference between the number of mango trees and the number of banana trees?
(A) 40 (B) 30
(C) 80 (D) 60
- Pictorial representation of data by a. number of bars of uniform width is called _____.
(A) Bar graph (B) Pictograph
(C) Pie chart (D) Tally marks
- Data collected from secondary sources like internet, magazines etc. is called _____.
(A) Secondary Data (B) Primary Data
(C) Tally marks (D) Frequency

11. The given pictograph shows the number of girls in class X–XII.

Class	Number of girls
X	
XI	
XII	
Each  represents 10 girls	

There are ____ girls in class X–XII.


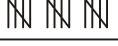



- (A) 120
 (B) 125
 (C) 50
 (D) 85
12. The given bar graph shows the number of cars sold from Jan to Dec.



How many cars were sold in the last quarter of the year ?

- (A) 280 (B) 130
 (C) 140 (D) 105

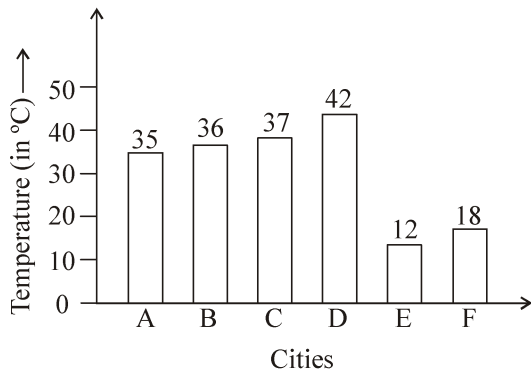
13. The given data shows the number of boys in classes V to X of a school.

Class	Number of boys
V	
VI	
VII	
VIII	
IX	
X	

What is the difference between the number of boys in class VI and class IX?

- (A) 1
 (B) 11
 (C) 11
 (D) 11
14. The presentation of data in the form of pictures is called ____.
- (A) Bar graph
 (B) Pictograph
 (C) Pie chart
 (D) None of these
15. The number of times an observation is repeated in a data is called ____.
- (A) Frequency
 (B) Sample
 (C) Pie chart
 (D) None of these

Direction (16 – 18) : The bar graph shows the temperatures in 6 big cities in a country. Study it carefully and answer the following questions.



16. The number of cities whose temperatures are between 30°C to 40°C is _____.
 (A) 2
 (B) 3
 (C) 4
 (D) 6
17. If a place with temperature equal to or above 35°C is considered to be hot, then the number of cold places is _____.
 (A) 1 (B) 2
 (C) 4 (D) 3
18. Production of cars in a factory in different years is shown here.

Year	1990	1991	1992	1993	1994
No. of Cars	1000	1500	2000	2400	3000

- The ratio of production in the year 1990 to 1994 is _____.
 (A) 1 : 3 (B) 1 : 2
 (C) 2 : 3 (D) 2 : 1

19. The following table shows the number of chocolates four friends have.

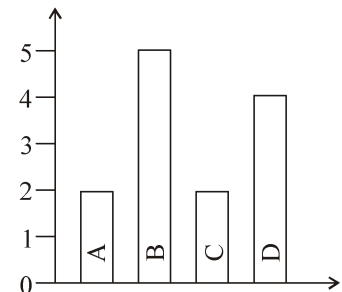
Name	No. of chocolates
Amit	10
Sumit	10
Ravi	15
Shekhar	18

- Two friends share the same number of chocolates. The number of chocolates each of them has _____.
 (A) 10 (B) 15
 (C) 18 (D) 0

20. Following information shows different type of soap used by children.









Soap	Tally Marks
Pears	
Lux	
Dove	
Nivea	

- Which soap is used by 9 children ?
 (A) Dove (B) Lux
 (C) Nivea (D) Pears
21. The two bars to the same value are _____.



- (A) A and B (B) B and C
 (C) C and D (D) A and C

22. The given pictograph shows the number of pizzas delivered by pizza hut during a week.





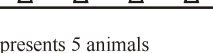

Days	Number of Pizzas
Monday	
Tuesday	
Wednesday	
Thursday	
Friday	
Saturday	
Sunday	
Each  represents 10 pizzas	

(i) On which day, the number of pizzas delivered is minimum?

(ii) Find the number of pizzas delivered on Sunday.

- (A) Wednesday, 60
- (B) Saturday, 60
- (C) Monday, 70
- (D) Tuesday, 70






23. The given pictograph shows the number of animals in 5 different zoos.

Name of Zoos	Number of animals
A	
B	
C	
D	
E	
Each  represents 5 animals	

Which of the following statements is CORRECT?

- (A) Number of animals in Zoo A is 10 more than the number of animals in Zoo B.
- (B) Number of animals in Zoo D is equal to the the number of animals in Zoo E.
- (C) Number of animals in Zoo C is 18.
- (D) Number of animals in Zoo A is twice the the number of animals in Zoo C.

Direction (24 – 25) : The following pictograph shows favourite ice cream flavours of boys in a colony.

Flavours	Number of Boys
Vanilla	
Mango	
Strawberry	
Butterscotch	
Each  represents 100 boys	

24. Which flavour is liked least by the boys ?

- (A) Mango
- (B) Vanilla
- (C) Strawberry
- (D) Butterscotch

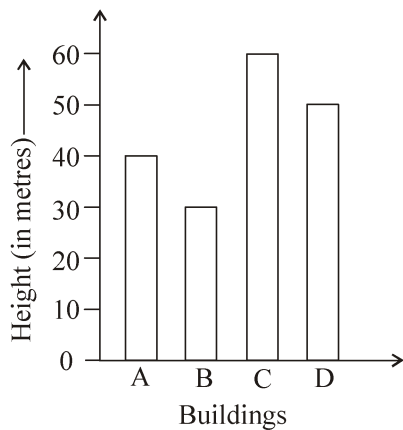
25. Number of boys liking vanilla flavoured ice cream are _____.

- (A) 700
- (B) 800
- (C) 500
- (D) 300

PARAGRAPH TYPE

PASSAGE # 1

The given bar graph shows the heights of different buildings.



26. The building that is 50 m tall is _____.
 (A) B
 (B) A
 (C) D
 (D) C
27. What is the height of building C ?
 (A) 50 m
 (B) 60 m
 (C) 20 m
 (D) 30 m
28. How much smaller the height of building B than height of building A ?
 (A) 10 m
 (B) 20 m
 (C) 40 m
 (D) 30 m

PASSAGE # 2

The given pictograph shows the books of different subjects kept in a school library.

Subject	Number of books
Hindi	
English	
History	
Science	
Mathematics	
Each represents 200 books	

29. How many English books are there in the library ?
 (A) 1500
 (B) 1200
 (C) 1000
 (D) 1300
30. How many Mathematics books are there in the library ?
 (A) 400
 (B) 200
 (C) 100
 (D) 300
31. Books of which subject are maximum in number ?
 (A) Hindi
 (B) Mathematics
 (C) English
 (D) Science

MATCH THE COLUMN

In this section each question has two matching lists.

Choices for the correct combination of elements from column-I and column-II are given as options


(A), (B), (C) and (D) out of which one is correct.


32. Match the following.

Column-I

Column-II

(P) If  represents 3 flowers, (i) 75


then  represents _____ flowers.

(Q)  represents 45 (ii) 10

stars, then  represents _____ stars.

(R)  represents 20 (iii) 9

trees, then  represents _____ trees.

(S)  represents 5 girls, then (iv) 20

 represents _____ girls.

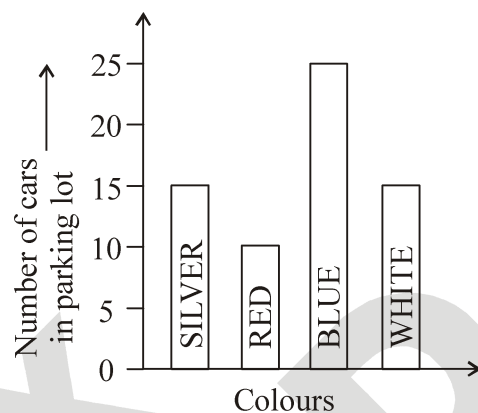
(A) P → i, Q → ii, R → iii, S → iv

(B) P → iii, Q → i, R → ii, S → iv

(C) P → iv, Q → iii, R → ii, S → i

(D) P → i, Q → iii, R → iv, S → ii

33. Study the bar graph and match the lists.



Column-I

Column-II

(P) Total number of cars in the (i) Blue parking lot is

(Q) Number of cars which are (ii) 25 blue in colour is

(R) The least common colour (iii) 65 among the cars is

(S) The most common colour (iv) Red among the cars is

(A) P → ii, Q → iii, R → i, S → iv

(B) P → i, Q → ii, R → iii, S → iv

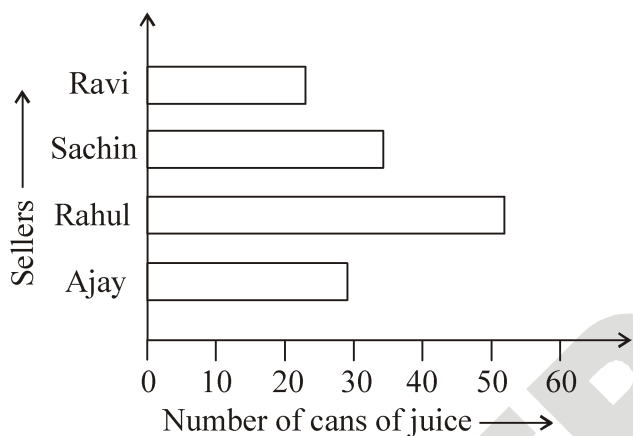
(C) P → iv, Q → iii, R → ii, S → i

(D) P → iii, Q → ii, R → iv, S → i

EXERCISE – II

VERY SHORT ANSWER TYPE

- Define Pictograph.
- The given bar graph shows the number of juice cans sold by 4 different sellers.



How many cans of juice Ajay sold ?

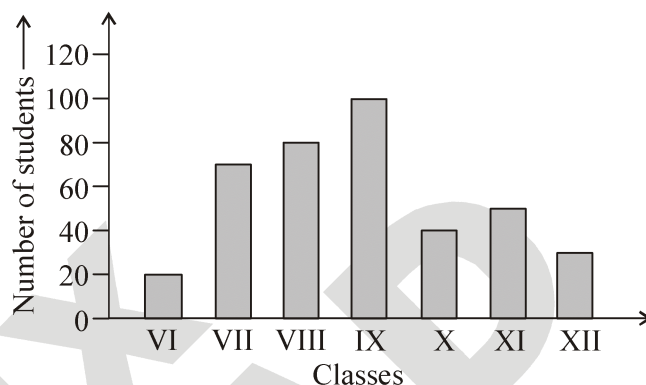
- The daily wages of 30 workers (in Rs) in a factory is given below.

40, 45, 35, 70, 60, 52, 49, 46, 65, 56, 60, 35, 45,
40, 50, 56, 57, 48, 55, 52, 50, 70, 75, 80, 50, 45,
52, 65, 72, 50

How many workers are earning less than Rs. 50 per day ?

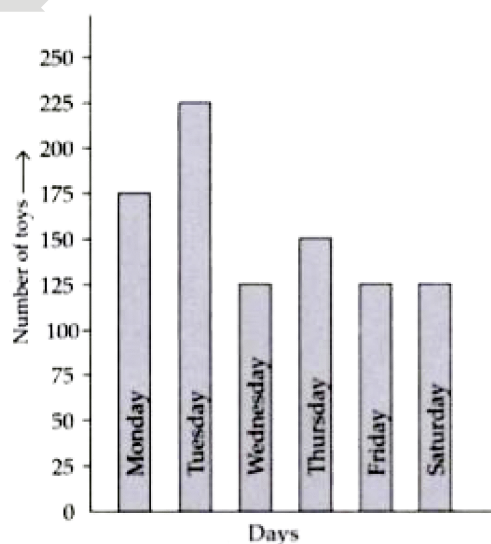
- The following is a list of size of shoes of 8 students of class VI : 5, 6, 5, 4, 5, 4, 6 and 4. If the shoe size less than 5 is observed for girls, how many girls are there in the list ?

- The following bar graph shows the number of students in different classes of a school.



How many more students are there in Class IX than in Class VIII ?

- The bar graph shows the number of toys produced by a factory during a certain week.



What is the total number of toys produced during the week ?

7. If \triangle represents 150 pillars, what does $\triangle\triangle\triangle\triangle$ represents ?
8. The given table shows the number of toffees four friends has

Name	Number of toffees
Naman	10
Meena	12
Garima	8
Jyoti	15

How many toffees does Garima have ? Represent it by tally marks.

9. Students of a class were tested to find their pulse rate. The following figures were obtained for the number of beats per minute.

70, 60, 70, 68, 67, 62, 71, 71, 59, 73, 73, 60, 60, 62, 62, 68, 70, 70, 70, 74, 69

How many students are there whose pulse rate is more than 60 per minute ?







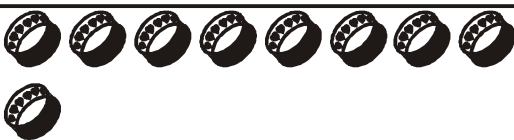

10. Given below are the marks obtained by 15 students of a class in a test .

26, 39, 21, 25, 30, 28, 22, 19, 20, 43, 6, 17, 18, 20, 40

If the student who got less than 20 marks is declared to be fail, then how many students are pass ?

SHORT ANSWER TYPE

1. The sales of rings on different days of the week is shown below. Based on the information given in pictograph, answer the following questions.

Days	Number of rings
Monday	
Tuesday	
Wednesday	
Thursday	
Friday	
Saturday	
Sunday	
Each  represents 2 rings	

- (i) How many rings were sold on Tuesday ?
- (ii) On which day, the maximum number of rings were sold ?
2. The birth rate per thousand of five countries over a period of time is shown below.

Country	China	India	Germany	U.K.	Sweden
Birth rate per thousand	35	42	14	49	28

Represent the above data by a bar graph.

3. A dice was thrown 26 times and the following outcomes were noted.

4, 3, 3, 2, 5, 4, 4, 6, 1, 2, 2, 3, 4, 6, 2, 3, 3, 4, 5, 6, 3, 2, 1, 3, 4, 3

Represent the above data in the tabular form using tally marks.

4. Draw a pictograph for representing the number of students in each class based on the given data.

Class	I	II	III	IV	V
Number of students	70	70	60	50	40

5. Number of persons in various age groups in a town is given in the following table.

Age group (in yrs)	No. of persons
1-14	2 lakhs
15-29	1 lakh 60 thousands
30-44	1 lakh 20 thousands
45-59	1 lakh 20 thousands
60-74	80 thousands
75 and above	40 thousands

Draw a bar graph for the given data.

LONG ANSWER TYPE

1. The following table shows the marks obtained by Sumit in the annual examination.

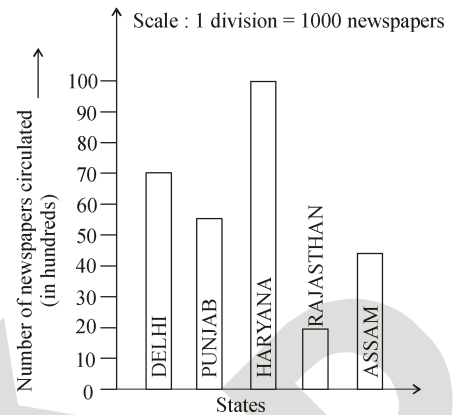
English	Maths	Hindi	Sanskrit	Science	Social Studies
50	40	60	70	50	55

Draw a bar graph to show the above informations.

2. Draw a bar graph to represent the following data.

Colour of T-shirt	Red	Blue	Orange	Pink	Green
No. of boys	40	52	36	48	30

3. Read the bar graph and answer the following questions.



- (i) What information is given by graph?
- (ii) Name the state in which 2000 newspapers are circulated.
- (iii) What is the difference between the newspapers circulated in Haryana and Delhi ?

4. The table given below shows the number of students playing four different games.

Games	Number of Students
Football	200
Hockey	160
Cricket	120
Badminton	80

Present this information as a pictograph.

5. Following pictograph shows favourite colour of boys in a colony. Study it and answer the following questions.


Colour	No. of boys
Green	
Pink	
Red	
blue	
Each represents 5 boys.	

- (i) What is the total number of boys in the colony ?
- (ii) Which two colours are liked by same number of boys ?
- (iii) How many more boys liked pink colour than red colour ?
- (iv) Which colour is most liked by boys ?

FILL IN THE BLANKS

- 1. On the scale of 1 unit length = 10 crore, the bar of length 6 units will represent _____ crore.
- 2. In a bar graph, bars of _____ width can be drawn horizontally or vertically.
- 3. _____ is the symbol of representing five tally marks.
- 4. Representation of data in tabular form is done by using _____.
- 5. All the bars in a bar graph should have uniform _____.

TRUE/FALSE TYPE

- 1. Data can be represented by bar graphs.
- 2.  denotes 4 entries in tally marks.
- 3. In a bar graph, the gap between two consecutive bars may not be the same.
- 4. Data collected directly from the source is called primary data.
- 5. In a bar graph, bars of uniform width are drawn vertically only.

INTEGER TYPE QUESTIONS



In this section, each question, when worked out will result in one integer from 0 to 9 (both inclusive).

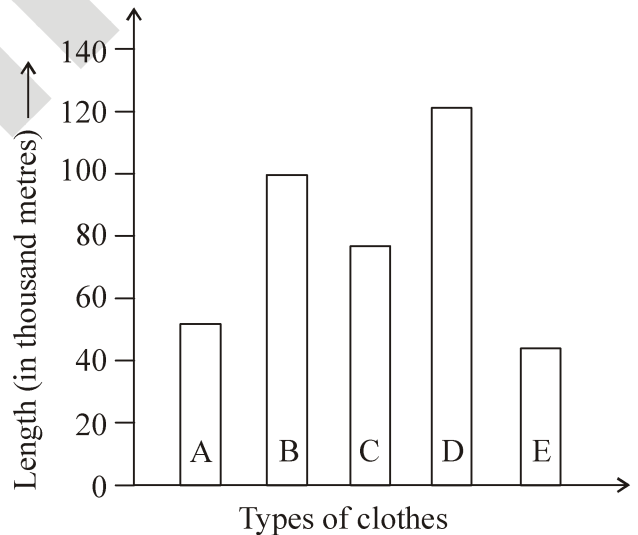
- 1. The frequency of 2 in the data 1, 1, 2, 2, 3, 3, 4, 4, 2, 2, 3 is _____.

- 2. Consider the runs scored by five friends in a match.



Persons	Runs scored
Jatin	80
Pradeep	85
Rohit	60
Dewanshu	80
Jitesh	72

If difference of Pradeep's and Rohit's scores is $10 \times m + n$, then what is the value of $m + n$?

- 3. If  represents 2 persons, then  represents _____ persons.
- 4. The bar graph shows the approximate length of different types of clothes produce in a factory.



If the length of cloth B produced is P metres, then the value of $P \div 1$ lakh is _____.

- 5. If  = 15 students, then  represents how many students ?

Answer Key

EXERCISE-I

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
C	C	B	C	D	D	B	A	A	A	D	D	D	B	A
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
B	B	A	A	C	D	D	D	A	A	C	B	A	B	D
31	32	33												
C	B	D												

EXERCISE – II

VERY SHORT ANSWER TYPE

1. The pictorial representation of data in the form of pictures, objects or parts of objects is called a pictograph.

2. Number of cans of juice sold by Ajay = 30

3. Number of workers earning less than Rs. 50 is 10.

4. Number of girls in the list = 3

5. Number of students in class IX = 100

Number of students in class VIII = 80

∴ Difference = 100 – 80 = 20

6. Total number of toys produced = 175 + 225 + 125 + 150 + 125 + 125 = 925

7. As $\uparrow = 150$ pillars

∴ $\uparrow \uparrow \uparrow \lrcorner = 3 \times 150 + \frac{150}{2} = 525$ pillars

8. Garima has 8 toffees. It is represented by ||||| .

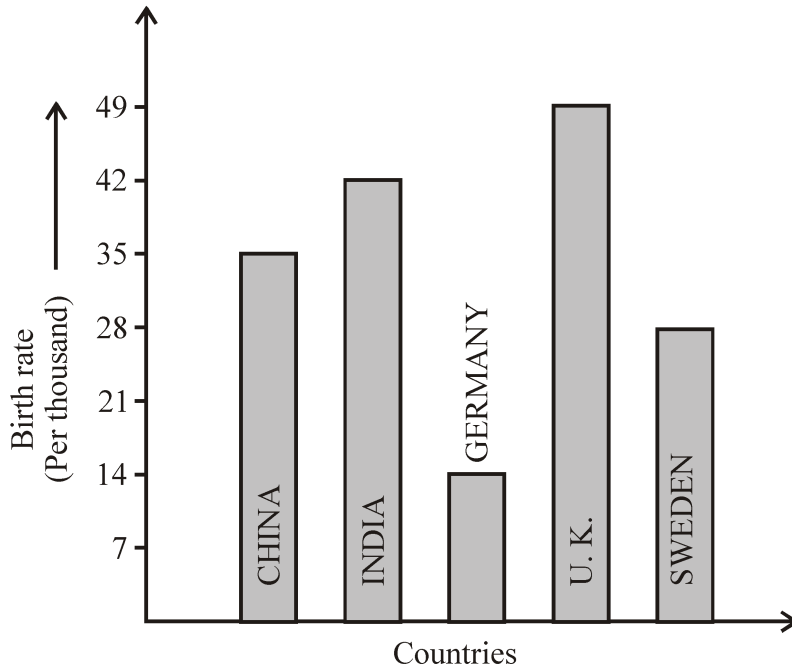
9. Number of students whose pulse rate is more than 60 per minute = 17.

10. Number of students who pass the test = 11.

SHORT ANSWER TYPE

1. (i) Number of rings sold on Tuesday = $4 \times 2 = 8$
 (ii) On Sunday, maximum number of rings were sold.







2.



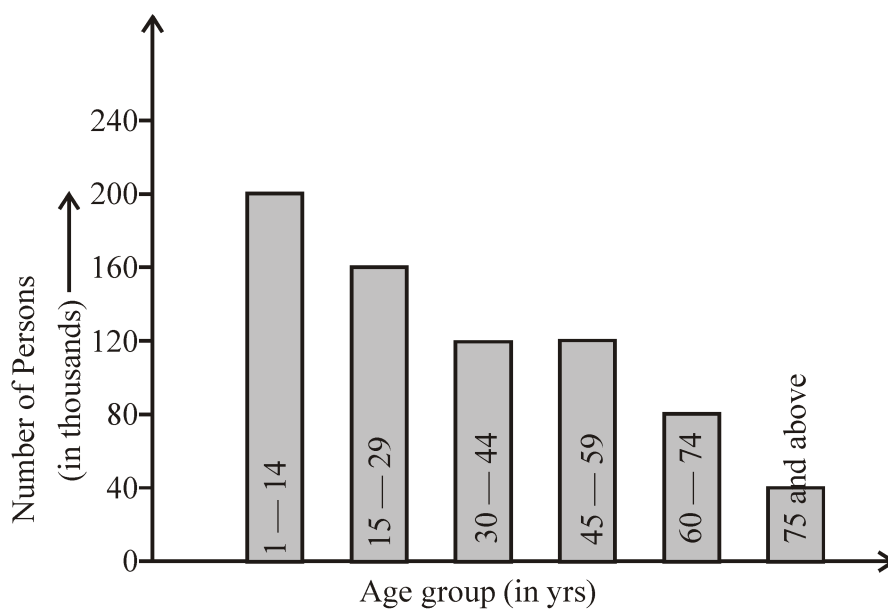
3.

No.on dice	Tally marks	Frequency
1	II	2
2	II	5
3	II III	8
4	II I	6
5	II	2
6	III	3
Total		26

4.

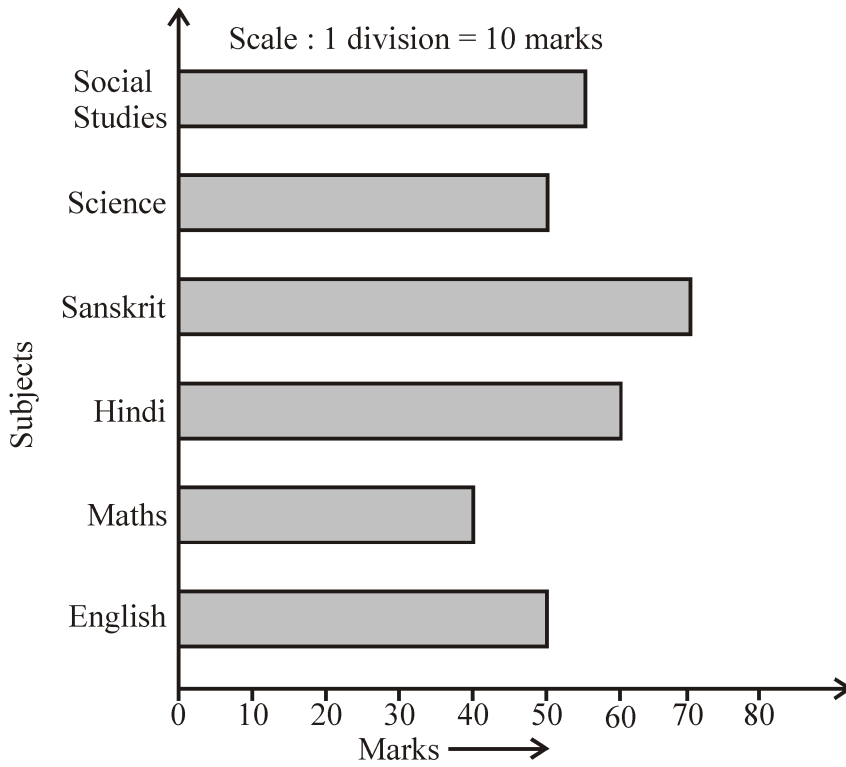
Classes	Number of students
I	
II	
III	
IV	
V	
Each  represents 10 students.	

5.

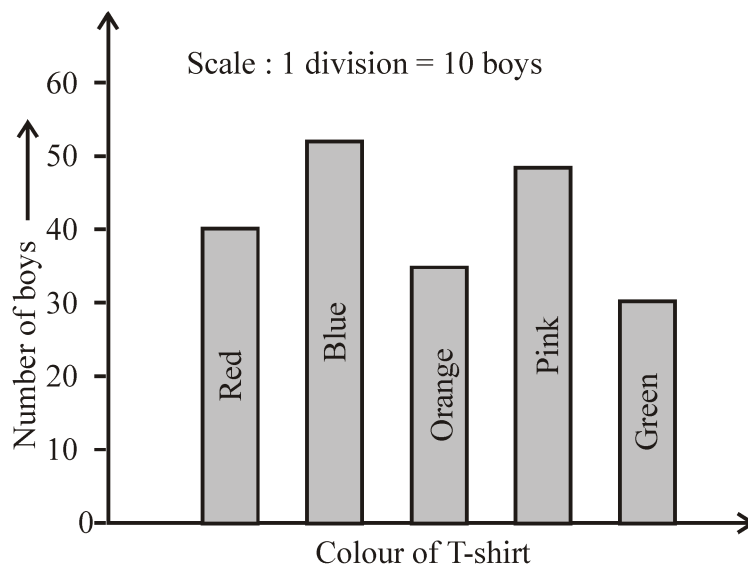


LONG ANSWERTYPE

1.








2.



3. (a) The bar graph shows the number of newspapers circulated in different states.
 (b) Rajasthan
 (c) Number of newspapers circulated in Haryana = $100 \times 100 = 10000$
 Number of newspapers circulated in Delhi = $70 \times 100 = 7000$
 \therefore Difference = $10000 - 7000 = 3000$

4.

Games	Number of students
Football	
Hockey	
Cricket	
Badminton	
Each  represents 40 students.	

5. (i) Total number of boys in the colony = $(5 + 4 + 1 + 4) \times 5 = 70$
 (ii) Pink and Blue
 (iii) Number of boys who liked red colour = 5
 Number of boys who liked pink colour = $4 \times 5 = 20$
 $\therefore 20 - 5 = 15$ more boys liked pink colour than red colour.
 (iv) Green colour is most liked by boys.

FILL IN THE BLANKS

1. 60 2. Equal 3. \mathbb{N} 4. Tally marks 5. Widths

TRUE/FALSE TYPE

1. T 2. F 3. F 4. T 5. F

INTEGER TYPE QUESTIONS

1. 4 2. 7 3. 9 4. 1 5. 5

SELF PROGRESS ASSESSMENT FRAMEWORK

(CHAPTER : DATA HANDLING)

CONTENT	STATUS	DATE OF COMPLETION	SELF SIGNATURE
Theory			
In-Text Examples			
Solved Examples			
NCERT Exercises			
Exercise I			
Exercise II			
Short Note-1			
Revision - 1			
Revision - 2			
Revision - 3			
Remark			

NOTES :

1. In the status, put “completed” only when you have thoroughly worked through this particular section.
2. Always remember to put down the date of completion correctly. It will help you in future at the time of revision.



Space for Notes :

A large rectangular area filled with horizontal dotted lines, intended for writing notes.



BASIC GEOMETRICAL IDEAS (LINES AND ANGLES)

4

Concepts

Introduction

1. **Point**
2. **Line, Line segment and ray**
 - 2.1 **Line**
 - 2.2 **Parallel lines**
 - 2.3 **Line segment**
 - 2.4 **Ray**
 - 2.5 **Collinear points**
 - 2.6 **concurrent lines**
3. **Curves**
4. **Angle**
 - 4.1 **Interior of an angle**
 - 4.2 **Exterior of an angle**
 - 4.3 **Adjacent angles**
 - 4.4 **LINEAR PAIR**
 - 4.5 **VERTICALLY OPPOSITE ANGLES**
 - 4.6 **COMPLEMENTARY ANGLES**
 - 4.7 **SUPPLEMENTARY ANGLES**
5. **Open and closed figures**
 - 5.1 **Open figures**
 - 5.2 **Closed figures**
6. **Polygon**
7. **Triangle**
 - 7.1 **Medians of a triangle**
 - 7.2 **Altitudes of a triangle**
8. **Quadrilateral**
 - 8.1 **Adjacent sides**
 - 8.2 **Opposite sides**
 - 8.3 **Adjacent angles**
 - 8.4 **Opposite angles**
 - 8.5 **Diagonals**
 - 8.6 **Interior and exterior of quadrilateral**
9. **Circles**
 - 9.1 **Secant**
 - 9.2 **ARC**
 - 9.3 **Semi-circle**
 - 9.4 **Segment**
 - 9.5 **Sector and quadrant**
 - 9.6 **Concentric circles**

Solved Examples

NCERT Solutions

Exercise - I (SCQ Type)

Exercise - II (Board Pattern Type)

Answer Key

INTRODUCTION

The part of mathematics that deals with such objects as points, lines, planes and space is called geometry. Some of the geometrical objects are triangle, rectangle, circle, etc.

The English word Geometry has been derived from the Greek word geometron which means to measure the Earth'. Geometrical ideas have developed over centuries to cater to needs in art, architecture etc. Here, we will discuss some basic concepts in geometry.

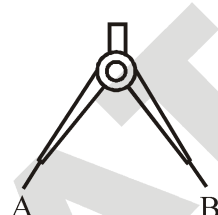
1. POINT

A point shows an exact location of an object. It is the basic unit of geometry. It is represented with the help of a dot. It is named by using a single capital English alphabet.

•A

This is point A

A point has no length and no breadth.



The tip of a compass



The sharpened end of a pencil



The pointed end of a needle

2. LINE, LINE SEGMENT AND RAY

2.1 LINE

A line is a collection of points going endlessly in both directions along a straight path.

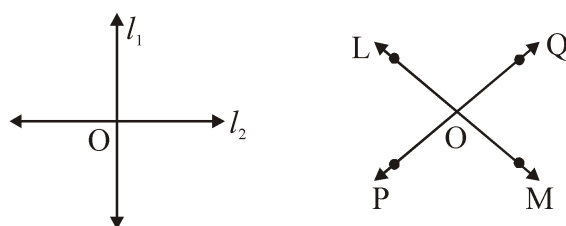
The symbol for a line is \leftrightarrow .



The arrows show that the line goes on endlessly in both directions. A and B are two points on the line. We call it line AB and write it as \overleftrightarrow{AB} or \overleftrightarrow{BA} . It can also be named by means of any small English letter, say l .

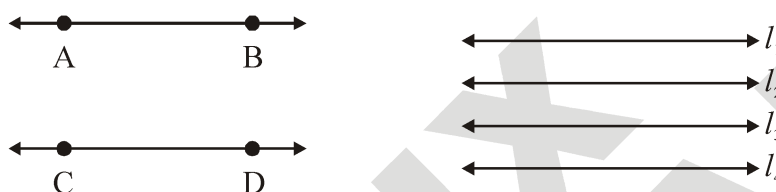


If two or more lines meet each other at one point then they are called intersecting lines. Two intersecting lines have one common point.



2.2 PARALLEL LINES

If two or more lines do not meet each other however far they are extended, then they are called parallel lines.



The opposite edges of a book, table ruler etc. are good example of parallel lines.

2.3 LINE SEGMENT

A line segment is part of a line. It has two endpoints and has a fixed length.

We name the segment by its endpoints.



The symbol for a line segment is “_____”.

Points P and Q are the two endpoints of the line segment PQ as shows above. We write it as \overline{PQ} or \overline{QP} .

2.4 RAY

You must have noticed rays of light coming out of a torch or car headlights. A ray is part of a line. It has one endpoint and goes on endlessly in one direction. The endpoint is mentioned first while naming a ray.

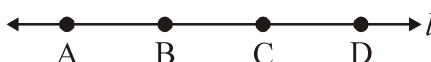


Ray QR is written as \overrightarrow{QR} . It is important to note that \overrightarrow{RQ} is not a ray as Q is an end point.

2.5 COLLINEAR POINTS

Three or more points in a plane are said to be collinear if they all lie on the same line.

In the given Fig, points A, B, C and D are collinear because only one line / passes through all of them.



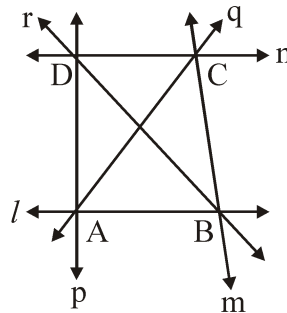
If the points do not lie on a line, they are called non-collinear points.

We have learnt earlier that through two given distinct points we can always draw a line. Thus two distinct points are always collinear. But given three distinct points may or may not be collinear. So we talk of collinearity of three or more distinct points.

Example 1

In figure name :

- (i) Four non-collinear points.
- (ii) Point of intersection of the lines l and m .
- (iii) Point of intersection of the lines r and n .
- (iv) Point of intersection of the lines q and n .
- (v) Point of intersection of the lines p and q .
- (vi) Four line segments.
- (vii) Two points on the line q .

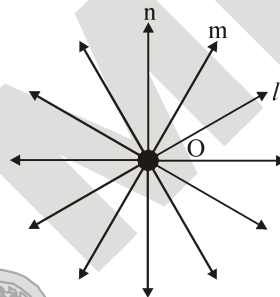


Solution :

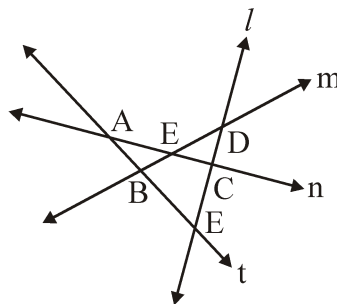
- (i) A, B, C, D
- (ii) B
- (iii) D
- (iv) C
- (v) A
- (vi) $\overline{AB}, \overline{BC}, \overline{CD}, \overline{AD}$
- (vii) A, C

2.6 CONCURRENT LINES

Three or more lines in plane are said to be concurrent if they all pass through the same point. In below figure, the line l, m, n, \dots all pass through a common point O . Such lines are said to be concurrent lines and we say that they are concurrent at O . The point O is called the point of concurrency.



The point of concurrency of three or more lines in a plane is also called the point of intersection of these given lines. Now look at below figure, the lines l, m, n, t are not concurrent lines but are intersecting lines. The points A, B, C, \dots are the points of intersection of the lines l, m, n, \dots but none of them is a point of concurrency. In this case the point of intersection is not point of concurrency.





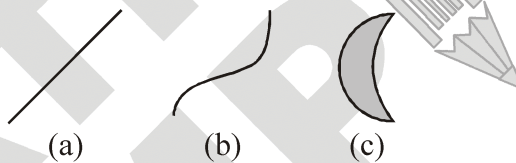
Focus Point

- We have learnt earlier that through two given distinct points we can always draw a line. Thus two distinct points are always collinear. But given three distinct points may or may not be collinear. So we talk of collinearity of three or more distinct points.
- As collinearity is defined for three or more points, we define concurrency for three or more lines.

3. CURVES

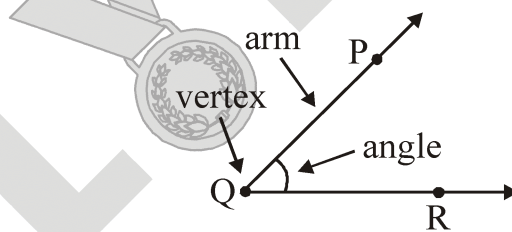
When you draw lines on a piece of paper without lifting the pencil and without using a scale, the shapes that you get are called curves. Some examples are shown below.

Simple Curve : A curve that does not cross itself is called a simple curve. The figures shown below are simple curves.



4. ANGLE

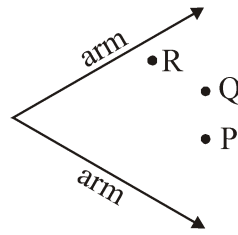
An angle is formed when two rays meet at a common point called a vertex. Each of these rays is called an arm of the angle. An angle is represented by the symbol \angle .



In figure \overrightarrow{QR} and \overrightarrow{QP} meet at the vertex Q to form an angle PQR. We write it as $\angle PQR$ or $\angle RQP$ or $\angle Q$. An angle can also be formed by the intersection of line segment.

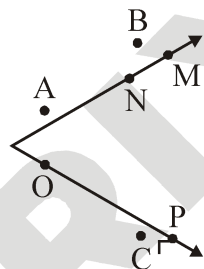
4.1 INTERIOR OF AN ANGLE

The space within the arms of an angle, produced indefinitely, is called the interior of the angle. In figure points P, Q and R are said to lie in the interior of the angle.



4.2 EXTERIOR OF AN ANGLE

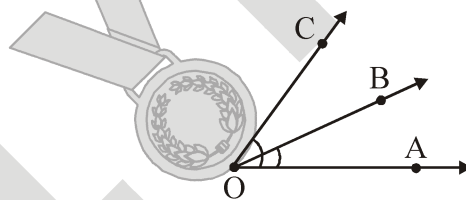
The space outside the arms of an angle, produced indefinitely, is called the exterior of the angle. Point A, B and C lie in the exterior of the angle shown in figure.



M, N, O and P are points on the angle and are, therefore, part of the angle.

4.3 ADJACENT ANGLES

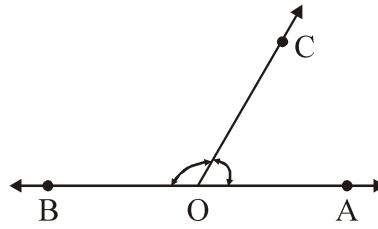
Two angles which have a common arm, a common vertex and lie on either side of the common arm are called adjacent angles. In figure $\angle AOB$ and $\angle BOC$ are adjacent angles as they have a common arm \overline{OB} , a common vertex O and both the angles AOB and BOC are on either side of the common arm \overline{OB} . Both the angles are distinct angles and no part of $\angle AOB$ is a part of $\angle BOC$ and vice versa.



4.4 LINEAR PAIR

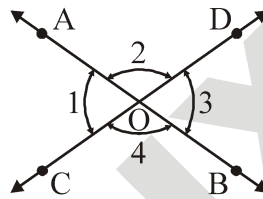
Two adjacent angles are said to form a linear pair of angles, if their non-common arms are two opposite rays, in figure. OA and OB are two opposite rays and $\angle AOC$ and $\angle BOC$ are the adjacent angles. Therefore, $\angle AOC$ and $\angle BOC$ form a linear pair.

$$\angle AOC + \angle BOC = 180^\circ$$



4.5 VERTICALLY OPPOSITE ANGLES

Two angles formed by two intersecting lines having no common arm are called vertically opposite angles.



4.6 COMPLEMENTARY ANGLES

If the sum of the measures of two angles is 90° , then the angles are called complementary angles and each is called a complement of the other. Angles of measures 35° and 55° are complementary angles.

4.7 SUPPLEMENTARY ANGLES

Two angles are said to be supplementary angles if the sum of their measures is 180° , and each of them is called a supplement of the other. Angles of measures 55° and 125° are supplementary angles.

5. OPEN AND CLOSED FIGURES

5.1 OPEN FIGURES

The figures that do not begin and end at the same point are called open figures.



5.2 CLOSED FIGURES

The figures that begin and end at the same point are called closed figures. They are also called closed curves. The closed curves that do not cross themselves are called simple closed curve.

For example : Triangle, circle, ellipse, rectangle, square, etc. are all closed figures.



Interior and Exterior of closed figures : There are three parts in a closed curve.

- (a) Interior (inside) of the curve.
- (b) Exterior (outside) of the curve.
- (c) Boundary of (on) the curve.

The interior of a curve together with its boundary is called its region.



A lies in the interior of the curve, B on its boundary and C lies in its exterior.

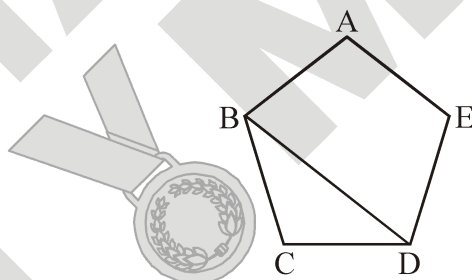
6. POLYGON

Polygon is a closed figure made by joining three or more line segments (not curves), where each line segments intersects exactly two other line segments. For example, triangle, quadrilateral, pentagon, etc., are all examples of polygon.



If all sides of a polygon are equal and all angles are also equal, then it is called a regular polygon. Sides, vertices, and diagonals.

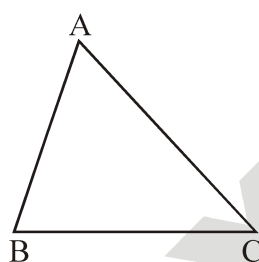
Consider the given figure. This is a polygon.



- (a) The line segment forming a polygon are called its side. In the given polygon \overline{AB} , \overline{BC} , \overline{CD} , \overline{DE} , \overline{EA} are sides.
- (b) Any two sides with a common end point are called adjacent sides.
- (c) The meeting point of a pair of sides is called vertex. Side \overline{AB} and \overline{BC} meet at B, so B is a vertex of the polygon ABCDE. Similar, A, C, D, and E are the other vertices.
- (d) The end points of the same side are called adjacent vertices. Vertices A and B are adjacent vertices but A and C are not.
- (e) The line joining two non-adjacent vertices of a polygon is called a diagonal. Since A and C are non-adjacent vertices, so \overline{AC} is a diagonal.

7. TRIANGLE

A triangle is a closed figure made of three line segments. In figure, line segments \overline{AB} , \overline{BC} and \overline{CA} form a closed figure. The figure given below is a triangle and is denoted by $\triangle ABC$. This triangle can also be named as $\triangle ABC$, $\triangle BCA$, $\triangle CAB$, $\triangle CBA$, $\triangle BAC$, or $\triangle ACB$.

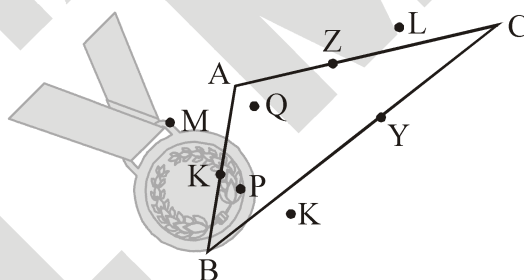


The line segments forming a triangle are the three sides of the triangle. In the above figure, \overline{AB} , \overline{BC} and \overline{CA} are the three sides of the triangle.

The point where any two of the three line segments of triangle intersect is called the vertex of the triangle. A triangle has three vertices. In the given figure, A, B and C are the three vertices.

When two line segments intersect, they form an angle at that point. In the above triangle \overline{AB} and \overline{BC} intersect at B and form an angle at that vertex. This angle at B is read as $\angle B$ or $\angle ABC$ or $\angle CBA$. Thus a triangle has three angles, $\triangle ABC$ has three angles namely $\angle A$, $\angle B$ and $\angle C$.

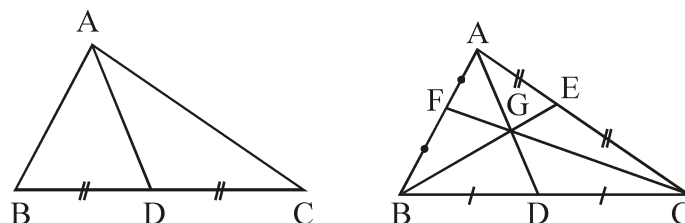
Look at $\triangle ABC$ in figure below points P and Q are in the interior of $\triangle ABC$. The region within the boundary of $\triangle ABC$ is called interior region of the triangle.



Note that $\triangle ABC$ only refers to the boundary of the figure and not its interior. Points X, Y and Z are on the boundary of the $\triangle ABC$ and hence they are on $\triangle ABC$. The interior region along with the boundary is known as the triangular region. Points K, L and M are on the exterior of $\triangle ABC$.

7.1 MEDIANS OF A TRIANGLE

A line segment joining a vertex to the mid-point of the side opposite to the vertex is called a median of the triangle.

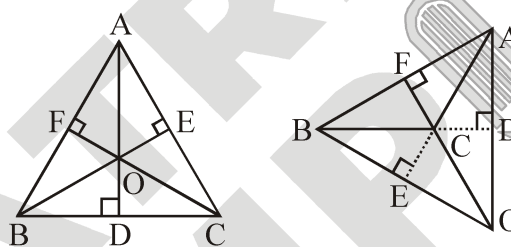


Thus, in the above figure, D is the mid-point of BC and AD is a median. Obviously, every triangle has three medians, one from each vertex.

The point G where all the median of triangle intersectes is known as centroid.

7.2 ALTITUDES OF A TRIANGLE

An altitude of a triangle is the perpendicular drawn from a vertex to the opposite side (produced if necessary).



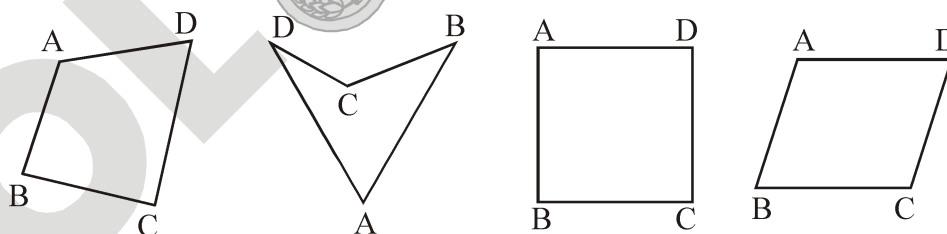
Clearly, every triangle has three altitudes, one from each vertex.

If we take BC as the base, then AD is called the height of the triangle.

The point O where all the altitudes of a triangle meets is known as orthocentre.

8. QUADRILATERAL

A quadrilateral is a closed figure formed by four line segments.



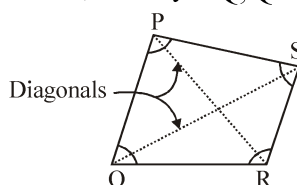
All the shapes shown above are quadrilaterals as they are all boundary by four line segments.

A quadrilateral has four sides, four vertices, and four angles. In the above figure \overline{AB} , \overline{BC} , \overline{CD} and \overline{DA} constitute the sides, and $\angle A$, $\angle B$, $\angle C$ and $\angle D$ are the four angles. These quadrilaterals are read as quadrilateral ABCD.

Elements of a quadrilateral

8.1 ADJACENT SIDES

In the quadrilateral PQRS there are four sides, namely \overline{PQ} , \overline{QR} , \overline{RS} and \overline{SP} .



The two sides of a quadrilateral having a common endpoint are called adjacent sides. Thus, sides \overline{PQ} and \overline{QR} are adjacent sides having the common endpoint Q. Sides \overline{QR} and \overline{RS} are also adjacent sides having the common endpoint R. Similarly, \overline{RS} and \overline{SP} are adjacent sides, and \overline{SP} and \overline{PQ} are also adjacent sides.

8.2 OPPOSITE SIDES

The sides \overline{PQ} and \overline{RS} are called opposite sides. Similarly, \overline{QR} and \overline{SP} are also opposite sides. They have no common end point.

8.3 ADJACENT ANGLES

Two angles of a quadrilateral which have a common arm are called adjacent angles.

Therefore $\angle P$ and $\angle Q$ are adjacent angles as they have a common arm \overline{PQ} . Similarly, $\angle Q$ and $\angle R$; $\angle R$ and $\angle S$; $\angle S$ and $\angle P$ are also adjacent angles.

8.4 OPPOSITE ANGLES

$\angle P$ and $\angle R$ are opposite angles as they have no common arm.

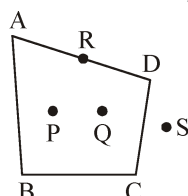
Similarly, $\angle Q$ and $\angle S$ are also opposite angles.

8.5 DIAGONALS

The line segments joining the opposite vertices are called the diagonals of the quadrilateral. \overline{QS} and \overline{PR} are the two diagonals of the quadrilateral PQRS.

8.6 INTERIOR AND EXTERIOR OF QUADRILATERAL

The region inside the quadrilateral ABCD is called its interior and that outside is called the exterior. In the given figure, four points P, Q, R and S are marked. P and Q are side to be in the interior of the quadrilateral ABCD, R is on the quadrilateral ABCD, while S is in the exterior of the quadrilateral ABCD.



The interior of the quadrilateral ABCD along with the quadrilateral ABCD is called the quadrilateral region of ABCD, i.e., P, Q and R are points in the quadrilateral region of the quadrilateral ABCD. A quadrilateral has four angles and the sum of all four angles of a quadrilateral is 360° .

9. CIRCLES

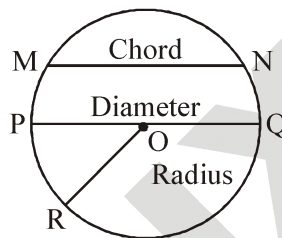
A circle is a simple closed curve all of whose points are at the same distance from a given point O in the same plane. The given point O is called the centre of the circle.

Parts of a circle :

A line segment joining the centre of a circle to any point on the circle is called a radius of that circle.

A line segment joining any two points on a circle is called a chord of that circle.

A chord that passes through the centre of a circle is called a diameter of that circle.

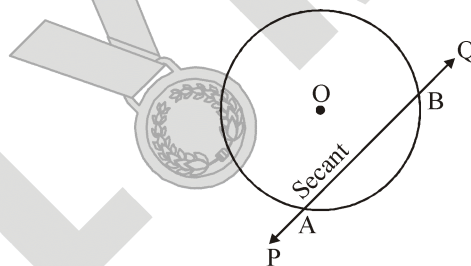


Focus Point

- A diameter is the longest chord of a circle.
- The diameter is twice the radius.
- The distance around a circle is called the circumference.

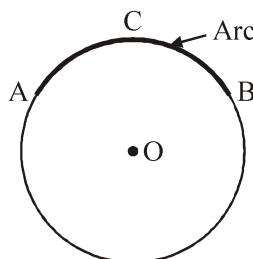
9.1 SECANT

A line which intersects or meets the circle at two distinct points is called a secant.



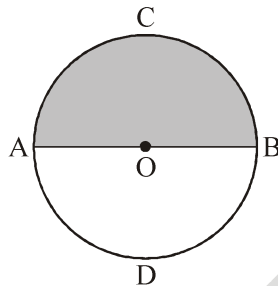
9.2 ARC

A part (continuous) of a circle is called an arc.



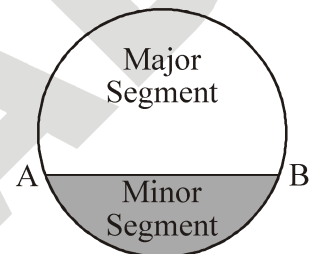
9.3 SEMI-CIRCLE

A diameter divides a circle into two equal parts which are called semi-circles.



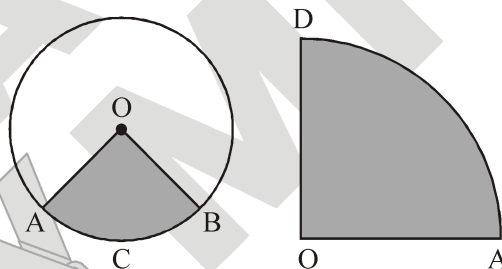
9.4 SEGMENT

A chord AB of a circle divides the area enclosed by it into two parts which are called segments. The smaller part is called a minor segment and the larger part a major segment. The chord also divides the circumference of the circle into two parts. The smaller part is called a minor arc because it is less than a semi-circle and the larger part a major arc because it is greater than a semi-circle.



9.5 SECTOR AND QUADRANT

The part of a circle enclosed by any two radii of the circle is called a sector of the circle.



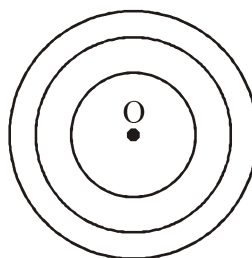
In this figure OACB is a sector.

If the two radii are at right angles to each other the sector is called a quadrant. A quadrant is thus $\frac{1}{4}$ th of a circle.

In the figure AOD is a quadrant.

9.6 CONCENTRIC CIRCLES

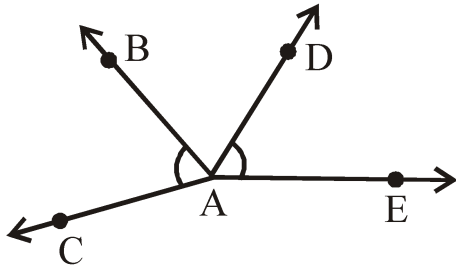
Two or more circles drawn with the same centre are called concentric circles.



SOLVED EXAMPLES

SE. 1

The number of common points in the two angles marked in given figure is _____.



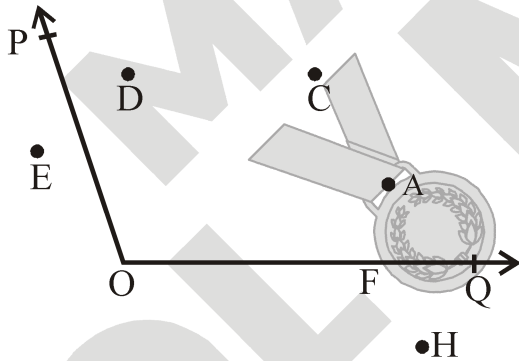
Ans. One : The two angles marked; $\angle CAB$ and $\angle DAE$.

The number of common point is 1 and that is A.

SE. 2

Name the points:

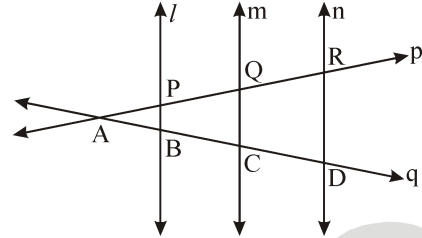
- (i) on $\angle POQ$
- (ii) In the interior of $\angle POQ$
- (iii) In the exterior of $\angle POQ$



- Ans.**
- (i) The point on $\angle POQ$ is F.
 - (ii) The points lying in the interior of $\angle POQ$ are D, C, A.
 - (iii) The points lying in the exterior of $\angle POQ$ are E and H.

SE. 3

In the given figure, name :



- (i) all pairs of parallel lines
- (ii) all pairs of intersecting lines
- (iii) lines whose point of intersection is P
- (iv) lines whose point of intersection is C
- (v) lines whose point of intersection is R
- (vi) collinear points

Ans.

- (i) Pairs of parallel lines : l and m ; m and n ; l and n .
- (ii) Pairs of intersecting lines : l, p ; m, p ; n, p ; l, q ; m, q ; n, q ; p, q .
- (iii) P is the point of intersection of lines l and p .
- (iv) C is the point of intersection of lines m and q .
- (v) R is the point of intersection of n and p .
- (vi) Collinear points are: A, P, Q, R and A, B, C, D.

SE. 4

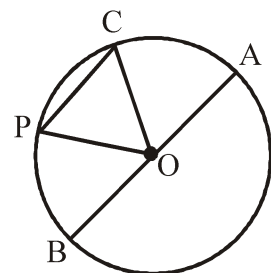
In given figure, name all rays with initial points as A, B and C respectively.



Ans. $\overrightarrow{AP}, \overrightarrow{AB}, \overrightarrow{AC}, \overrightarrow{AQ}, \overrightarrow{BP}, \overrightarrow{BA}, \overrightarrow{BC}, \overrightarrow{BQ}, \overrightarrow{CP}, \overrightarrow{CA}, \overrightarrow{CB}, \overrightarrow{CQ}$

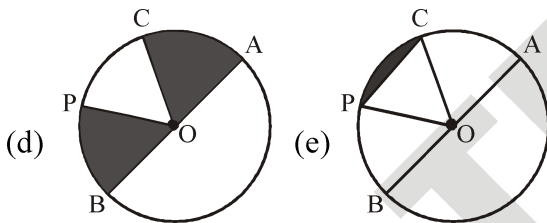
SE. 5

In the given figure, O is the centre of the circle.



- (a) Name all chords of the circle.
- (b) Name all radii of the circle.
- (c) Name of chord, which is not the diameter of the circle.
- (d) Shade sectors OAC and OPB.
- (e) Shade the minor segment of the circle formed by CP.

- Ans.** (a) Chords : PC and BA.
 (b) Radii : PO, OC , OB and OA.
 (c) PC is a chord which is not the diameter of the circle.

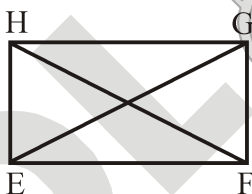


SE. 6

Draw a sketch of quadrilateral EFGH. State:

- (i) Two pairs of adjacent sides
- (ii) Vertices
- (iii) two pairs of opposite sides
- (iv) Diagonals

Ans.



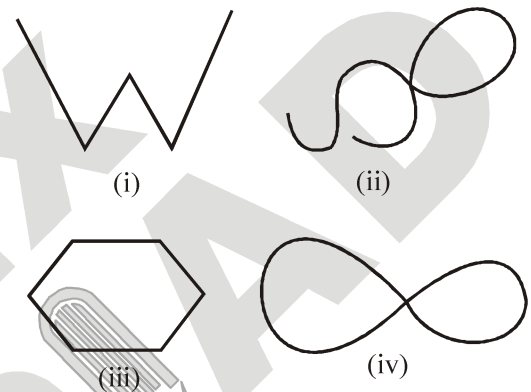
EFGH is quadrilateral.

- (i) Two pairs of adjacent sides are EF, FG
GH, HE.

- (ii) E, F, G and H are four vertices of quadrilateral EFGH.
- (iii) Opposite sides are EF and GH; FG and HE.
- (iv) EG and FH are two diagonals.

SE. 7

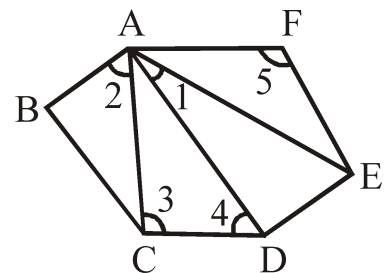
Classify the following curves as open or closed.



- Ans.** Open Curve : (i) & (ii)
 Closed Curve : (iii) & (iv)

SE. 8

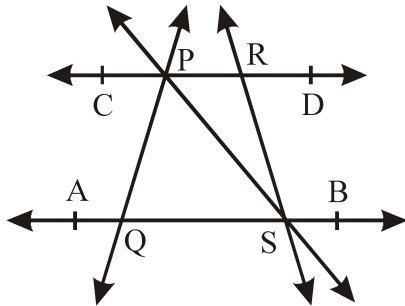
In figure, write another name for the following angles:



- (i) $\angle 1$ (ii) $\angle 2$ (iii) $\angle 3$
 - (iv) $\angle 4$ (v) $\angle 5$
- Ans.** (i) $\angle DAE$ (ii) $\angle BAC$ (iii) $\angle ACD$
 (iv) $\angle CDA$ (v) $\angle AFE$

SE. 9

In the given figure, name :



- (i) Four pairs of intersecting lines
- (ii) Four collinear points
- (iii) Three non-collinear points
- (iv) Three lines whose point intersection is P

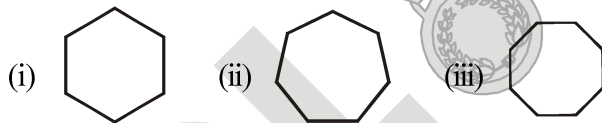
Ans.

- (i) Four pairs of intersecting lines are :
PQ, PS; RS, PS; AB, PQ; AB, RS
- (ii) Four collinear points are : A, Q, S and B.
- (iii) Three non-collinear points are : P, Q and S.
- (iv) Three lines whose point of intersection is P
are : PS, CD and PQ.

SE. 10

How many diagonals does each figure have ?

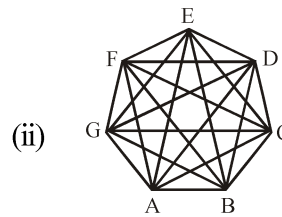
Name them.



Ans.

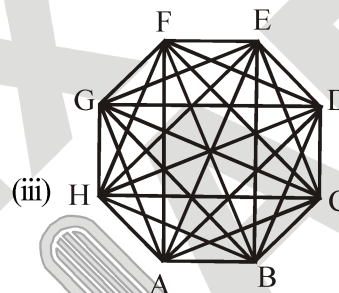


Diagonals are: AC, AD, AE, BD, BE, BF, CE, CF, DF. Hence, there are 9 diagonals.



(ii)

Diagonals are : AC, AD, AE, AF, BD, BE, BF, BG, CE, CF, CG, DF, DG, EG.
Hence, there are 14 diagonals.



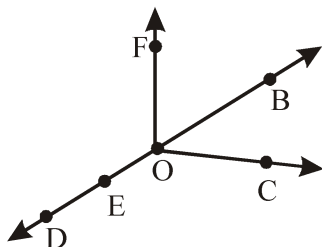
(iii)

Diagonals are : AC, AD, AE, AF, AG, BD, BE, BF, BG, BH, CE, CF, CG, CH, DF, DG, DH, EG, EH, FH. Hence, there are 20 diagonals.

EXERCISE - 4.1

NS. 1

Use the figure to name :



- (a) Five points
- (b) A line
- (c) Four rays
- (d) Five line segments

- Ans.** (a) Five points : O, B, C, D, E
 (b) A line : \overleftrightarrow{DB}
 (c) Four rays : $\overrightarrow{OD}, \overrightarrow{OF}, \overrightarrow{OC}, \overrightarrow{OB}$
 (d) Five line segments : DE, OE, OC, OB, OD

NS. 2

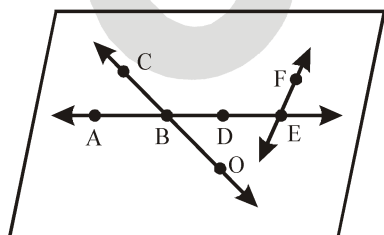
Name the line given in all possible (twelve) ways, choosing only two letters at a time from the four given.



- Ans.** Possible lines are $\overline{AB}, \overline{AC}, \overline{AD}, \overline{BC}, \overline{BD}, \overline{CD}, \overline{BA}, \overline{CA}, \overline{DA}, \overline{CB}, \overline{DB}, \overline{DC}$

NS. 3

Use the figure to name :



- (a) Line containing point E.

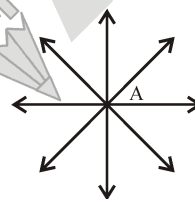
- (b) Line passing through A.
 - (c) Line on which O lies.
 - (d) Two pairs of intersecting lines.
- Ans.** (a) A line containing point E is \overline{AE} .
 (b) A line passing through A is \overline{AE} .
 (c) A line on which O lies is \overline{CO} or \overline{OC} .
 (d) Two pairs of intersecting lines are $\overline{AD}, \overline{CO}$ and $\overline{AE}, \overline{FE}$

NS. 4

How many lines can pass through

- (a) one given point? (b) two given points?

- Ans.** (a) Infinite number of lines can pass through one given point.



- (b) Only one line can pass through two given points.

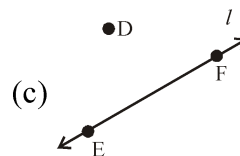
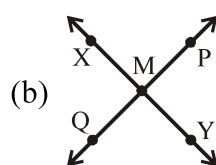


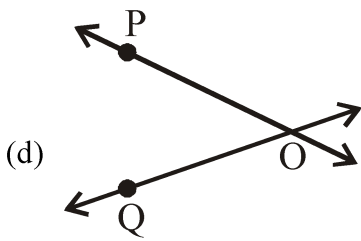
NS. 5

Draw a rough figure and label suitably in each of the following cases:

- (a) Point P lies on \overline{AB} .
- (b) \overline{XY} and \overline{PQ} intersect at M.
- (c) Line l contains E and F but not D.
- (d) \overline{OP} and \overline{OQ} meet at O.

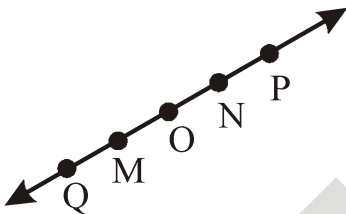
- Ans.** (a)





NS. 6

Consider the following figure of line \overleftrightarrow{MN} . Say whether following statements are true or false in context of the given figure.



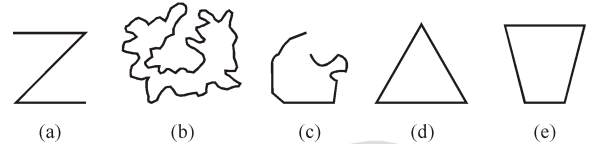
- (a) Q, M, O, N, P are points on the line \overleftrightarrow{MN} .
- (b) M, O, N are points on a line segment \overline{MN} .
- (c) M and N are end points of line segment \overline{MN} .
- (d) O and N are end points of line segment \overline{OP} .
- (e) M is one of the end points of line segment \overline{QO} .
- (f) M is point on ray \overrightarrow{OP} .
- (g) Ray \overrightarrow{OP} is different from ray \overrightarrow{QP} .
- (h) Ray \overrightarrow{OP} is same as ray \overrightarrow{OM} .
- (i) Ray \overrightarrow{OM} is not opposite to ray \overrightarrow{OP} .
- (j) O is not an initial point of \overline{OP} .
- (k) N is the initial point of \overline{NP} and \overline{NM} .

- Ans.** (a) True (b) True (c) True (d) False
 (e) False (f) False (g) True (h) False
 (i) False (j) False (k) True

EXERCISE - 4.2

NS. 1

Classify the following curves as (i) Open or (ii) Closed.



- Ans.** (a) Open curve
 (b) Closed curve
 (c) Open curve
 (d) Closed curve
 (e) Closed curve

NS. 2

Draw rough diagrams to illustrate the following

- (a) Open curve
- (b) Closed curve.

Ans. (a) Open curves :

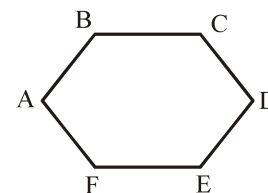


(b) Closed curves :



NS. 3

Draw any polygon and shade its interior.

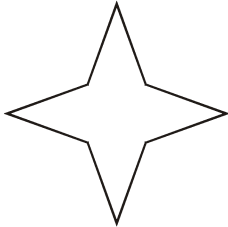


Ans.

ABCDEF is the required polygon.

NS. 4

Consider the given figure and answer the questions



- (a) Is it a curve?
- (b) Is it closed?

Ans. (a) Yes, it is a curve.
(b) Yes, it is closed.

NS. 5

Illustrate, if possible, each one of the following with a rough diagram:

- (a) A closed curve that is not a polygon.
- (b) An open curve made up entirely of line segments.
- (c) A polygon with two sides.

Ans. (a)



(b)

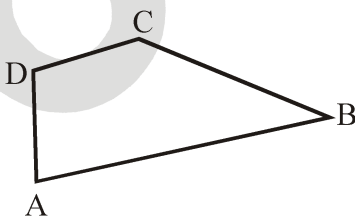


(c) Polygon with two sides cannot be drawn.

EXERCISE - 4.3

NS. 1

Name the angle in the given figure.

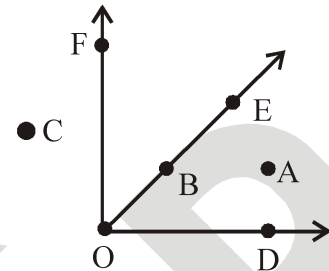


Ans. There are four angles in the given figure i.e., $\angle ABC$, $\angle CDA$, $\angle DAB$, $\angle DCB$

NS. 2

In the given diagram, name the point(s)

- (a) In the interior of $\angle DOE$
- (b) In the exterior of $\angle EOF$
- (c) On $\angle EOF$



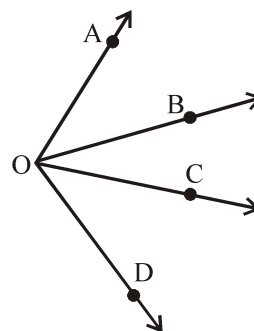
Ans. (a) Point in the interior of $\angle DOE$: A
(b) Points in the exterior of $\angle EOF$: C, A, D
(c) Points on $\angle EOF$: E, O, B, F

NS. 3

Draw rough diagrams of two angles such that they have

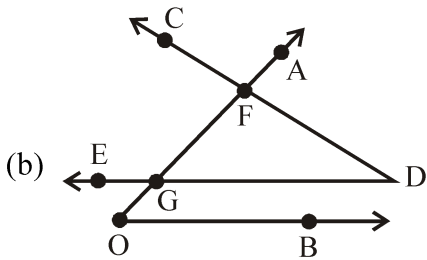
- (a) One point in common.
- (b) Two points in common.
- (c) Three points in common.
- (d) Four points in common.
- (e) One ray in common.

Ans. (a)

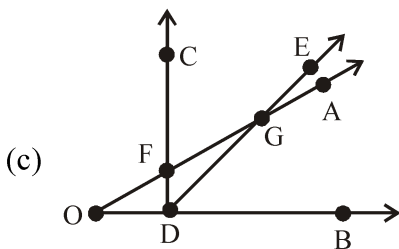


Here, two angles are $\angle AOD$ and $\angle BOC$ and point O is common.

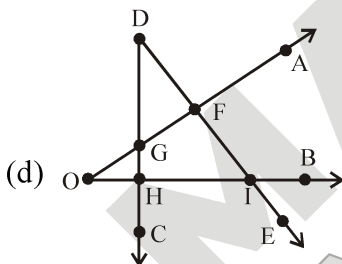
EXERCISE - 4.4



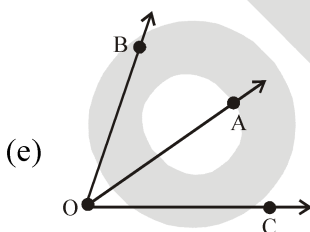
Here, two angles are $\angle AOB$ and $\angle CDE$ and two points F and G are common.



Here, two angles are $\angle AOB$ and $\angle CDE$ and three points F, D and G are common.



Here, two angles are $\angle AOB$ and $\angle CDE$ and four points F, G, H and I are common.

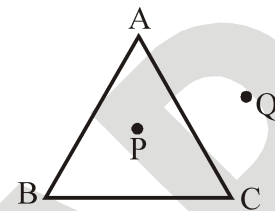


Here, two angle are $\angle AOB$ and $\angle AOC$ and ray OA is common.

NS. 1

Draw a rough sketch of a triangle ABC. Mark a point P in its interior and a point Q in its exterior. Is the point A in its exterior or in its interior?

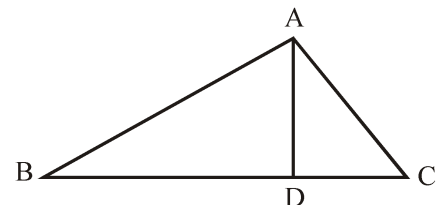
Ans. We have



A is neither in the interior nor in the exterior of the triangle ABC. It is a vertex.

NS. 2

- Identify three triangles in the figure.
- Write the names of seven angles.
- Write the names of six line segments.
- Which two triangles have $\angle B$ as common?

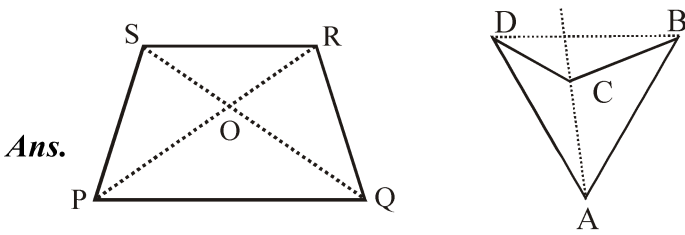


- Ans.**
- The three triangles are $\triangle ABC$, $\triangle ABD$, $\triangle ADC$
 - Seven angles are $\angle ADB$, $\angle ADC$, $\angle ABD$, $\angle ACD$, $\angle BAD$, $\angle CAD$, $\angle BAC$
 - Six line segments are \overline{AB} , \overline{AC} , \overline{AD} , \overline{BD} , \overline{DC} , \overline{BC}
 - Two triangles having $\angle B$ as common are $\triangle ABC$, & $\triangle ABD$

EXERCISE - 4.5

NS. 1

Draw a rough sketch of a quadrilateral PQRS, Draw its diagonals. Name them. Is the meeting point of the diagonals in the interior or exterior of the quadrilateral?

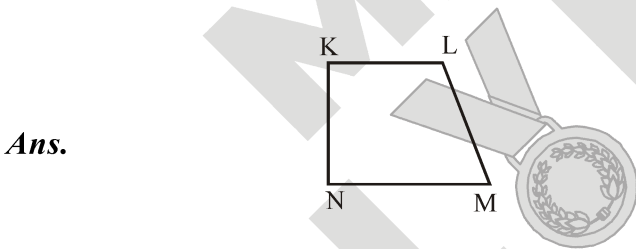


Diagonal meet in interior Diagonal meet in exterior

NS. 2

Draw a rough sketch of a quadrilateral KLMN. State,

- (a) two pairs of opposite sides,
- (b) two pairs of opposite angles,
- (c) two pairs of adjacent sides,
- (d) two pairs of adjacent angles.



Ans.

- (a) Two pairs of opposite sides : \overline{KL} and \overline{NM} , \overline{KN} and \overline{LM}
- (b) Two pairs of opposite angles : $\angle K$ and $\angle M$, $\angle L$ and $\angle N$
- (c) Two pairs of adjacent sides : \overline{KN} and \overline{NM} , \overline{KL} and \overline{LM}
- (d) Two pairs of adjacent angles : $\angle K$ and $\angle N$, $\angle L$ and $\angle M$

NS. 3

Investigate :

Use strip and fasteners to make a triangle and a quadrilateral. Try to push inward at any one vertex of the triangle. Do the same to the quadrilateral. Is the triangle distorted? Is the quadrilateral distorted? Is the triangle rigid ? Why is it that structures like electric towers make use of triangular shapes and not quadrilaterals ?

Ans. No, the triangle is not distorted but the quadrilateral is distorted and also the triangle is rigid.

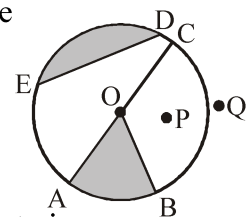
Structures like electric towers make use of triangular shape so that they could not be distorted and they could be rigid.

EXERCISE - 4.6

NS. 4

From the figure, identify :

- (a) the centre of circle
- (b) three radii
- (c) a diameter
- (d) a chord
- (e) two points in the interior
- (f) a point in the exterior
- (g) a sector
- (h) a segment



- Ans.**
- (a) O is the centre of circle.
 - (b) Three radii : \overline{OA} , \overline{OB} and \overline{OC}
 - (c) A diameter : \overline{AC}
 - (d) A chord : \overline{ED}
 - (e) Two interior points : O and P

- (f) Exterior point : Q
- (g) A sector : OAB (shaded part)
- (h) A segment : ED (shaded part)

NS. 5

- (a) Is every diameter of a circle also a chord?
- (b) Is every chord of a circle also a diameter?

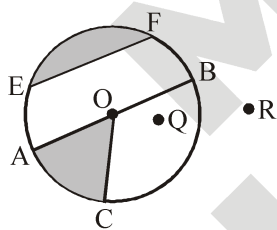
- Ans.** (a) Yes, every diameter of a circle is also a chord. It is the largest chord of a circle.
 (b) No, every chord of a circle is not a diameter.

NS. 6

Draw any circle and mark

- (a) its centre
- (b) a radius
- (c) a diameter
- (d) a sector
- (e) a segment
- (f) a point in its interior
- (g) a point in its exterior
- (h) an arc

Ans.



- (a) O is the centre of the circle.
- (b) \overline{OA} is the radius.
- (c) \overline{AB} is the diameter.
- (d) OAC is the sector, (shaded part)
- (e) EF is the segment, (shaded part)
- (f) Q is a point in its interior.
- (g) R is a point in its exterior,
- (h) \widehat{AB} is an arc.

NS. 7



Say true or false :

- (a) Two diameters of a circle will necessarily intersect.
- (b) The centre of a circle is always in its interior.

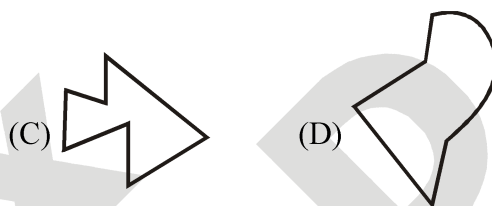
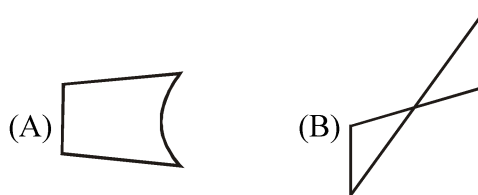
- Ans.** (a) True (b) True

EXERCISE – I

ONLY ONE CORRECT TYPE

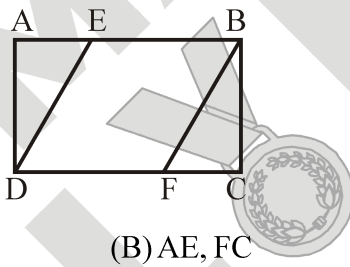
1. A line has
 (A) fixed length
 (B) infinite length
 (C) no length
 (D) none of these
2. A point where three or more lines meet is called the _____.
 (A) point of concurrence
 (B) meeting point
 (C) collinear point
 (D) non-collinear point
3. A ray has :
 (A) one end point (B) two end points
 (C) same plane (D) none of these
4. We can draw _____ line (s) passing through two points.
 (A) one (B) two
 (C) three (D) infinite
5. The figure shows 
 (A) \overrightarrow{OA} (B) \overrightarrow{AO}
 (C) \overline{O} (D) \overline{A}
6. In the figure, the curve is 
 (A) an open curve
 (B) a closed curve
 (C) a simple closed curve
 (D) none of these

7. Which of the following is a polygon?

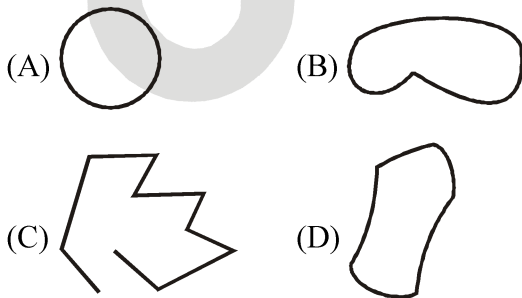


8. The join of two vertices of polygon which are not adjacent is called _____.
 (A) A side (B) A diagonal
 (C) An angle (D) None of these
9. An angle has:
 (A) One vertex and one arm
 (B) One vertex and two arms
 (C) Two vertex and Two arms
 (D) None of these
10. $\angle AOB$ can also named as:
 (A) $\angle ABO$ (B) $\angle BAO$
 (C) $\angle BOA$ (D) None of these
11. A closed figure formed by joining three non-collinear points is called _____.
 (A) A triangle (B) An angle
 (C) A curve (D) None of these
12. A polygon having three sides is called a _____.
 (A) Curve (B) Triangle
 (C) Quadrilateral (D) None of these

13. Quadrilateral is a polygon having:
 (A) Two sides (B) Three sides
 (C) Four sides (D) None of these
14. A circle is
 (A) a polygon (B) an open curve
 (C) a closed curve (D) none of these
15. A line segment joining any two points on the circle is called a _____
 (A) radius (B) diameter
 (C) chord (D) secant
16. The length of the boundary of a circle is called its.
 (A) arc (B) circumference
 (C) diameter (D) none of these
17. How many pairs of opposite sides are there in a quadrilateral ?
 (A) 1 (B) 2
 (C) 3 (D) 4
18. Which of the following pair of line segments are not parallel, as shown in the figure?



- (A) AD, BC (B) AE, FC
 (C) DE, BF (D) AB, BC
19. Which of the following figure is not a closed figure.

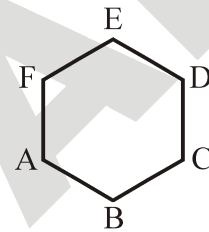


20. An arc is a continuous part of the _____ of the circle.
 (A) Diameter
 (B) Major segment
 (C) Circumference
 (D) Chord

PARAGRAPH TYPE

PASSAGE

A polygon is entirely made up of straight lines only.
 A hexagon ABCDEF is a six-sided polygon.



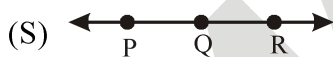
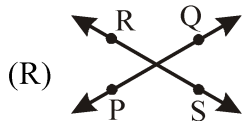
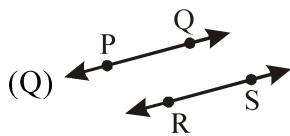
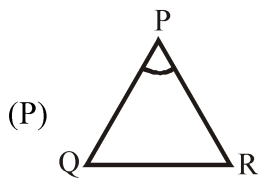
21. How many diagonals are there in the hexagon ?
 (A) 7 (B) 8
 (C) 9 (D) 10
22. How many line segments are there in the hexagon ?
 (A) 5 (B) 6
 (C) 7 (D) 8
23. How many angles are there in the hexagon ?
 (A) 5 (B) 6
 (C) 7 (D) 8

MATCH THE FOLLOWING

In this section each question has two matching lists. Choices for the correct combination of elements from Column-I and Column-II are given as option (A), (B), (C) and (D) out of which one is correct.

24. Match the following :

Column-I



Column-II

(i) Collinear points

(ii) $\angle QPR$

(iii) Parallel Lines

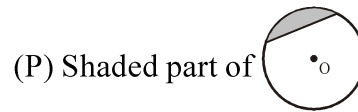
(iv) Intersecting Lines

- (A) P \rightarrow i, Q \rightarrow iv, R \rightarrow iii, S \rightarrow ii
- (B) P \rightarrow ii, Q \rightarrow iii, R \rightarrow i, S \rightarrow iv
- (C) P \rightarrow ii, Q \rightarrow iii, R \rightarrow iv, S \rightarrow i
- (D) P \rightarrow ii, Q \rightarrow iv, R \rightarrow iii, S \rightarrow i

25. Match the following :

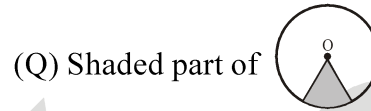
Column-I

Column-II



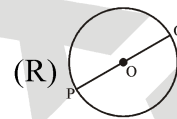
(i) Sector

represents



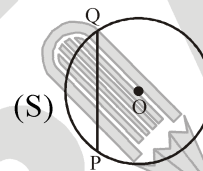
(ii) Segment

represents



Here PQ is a

(iii) Chord



Here PQ is a

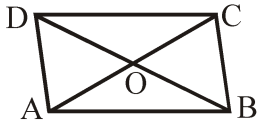
(iv) Diameter

- (A) P \rightarrow i, Q \rightarrow ii, R \rightarrow iv, S \rightarrow iii
- (B) P \rightarrow ii, Q \rightarrow i, R \rightarrow iv, S \rightarrow iii
- (C) P \rightarrow i, Q \rightarrow ii, R \rightarrow iii, S \rightarrow iv
- (D) P \rightarrow i, Q \rightarrow i, R \rightarrow iii, S \rightarrow iv

EXERCISE – II

VERY SHORT ANSWER TYPE

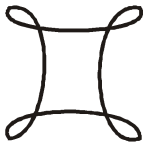
1. Count the number of line segments drawn in the following figure and name them.



2. Which of the following are polygons ?



(A)

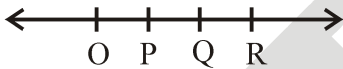


(B)

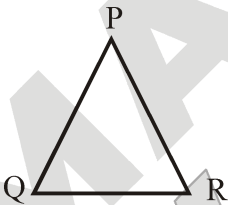


(C)

3. From the given figure, write the names of the rays drawn in the same directions :



4. Name the vertices and sides of the given triangle.



5. Identify the open and closed curves.



(1)



(2)

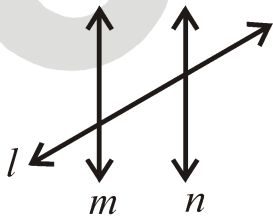


(3)

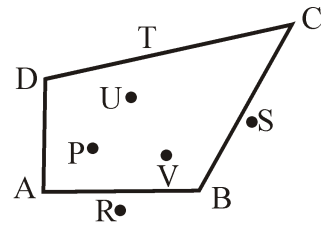


(4)

6. Name the pair of all intersecting lines in the given figure.



7. Write the points, which lie



- (i) in the interior of quadrilateral ABCD.
- (ii) in the exterior of quadrilateral ABCD.
- (iii) on the boundary of quadrilateral ABCD.

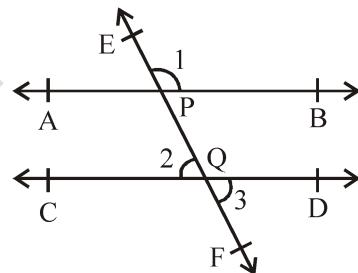
8. If the line l passing through the points A and B also passes through the point C then what are the three points A, B and C called ?

9. In the given figure, write another name for :

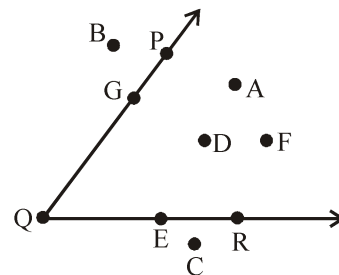
(i) $\angle 1$

(ii) $\angle 2$

(iii) $\angle 3$



10. In the given figure, name the points which are



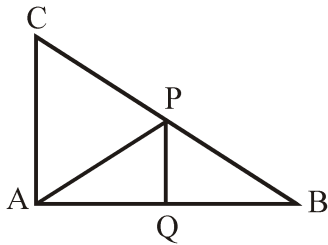
(i) in the interior of $\angle PQR$

(ii) in the exterior of $\angle PQR$

(iii) on $\angle PQR$

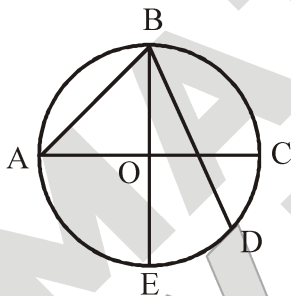
SHORT ANSWER TYPE

1. Study the given figure and answer the following questions.



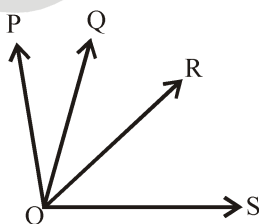
- (i) Name all the triangles formed in the given figure.
- (ii) Which two points lie on sides BC and AB respectively?
- (iii) Name any two line segments inside the triangle ABC.

2. In the given figure, name the following :

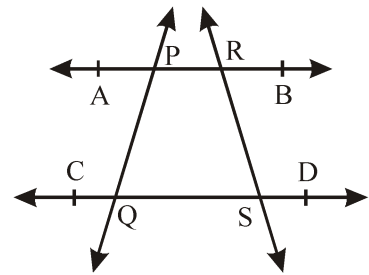


- (i) centre of the circle
- (ii) radii of the circle
- (iii) diameters of the circle
- (iv) chords of the circle
- (v) two minor and major arcs

3. How many angles are formed in the following figure? Write the adjacent angles also.

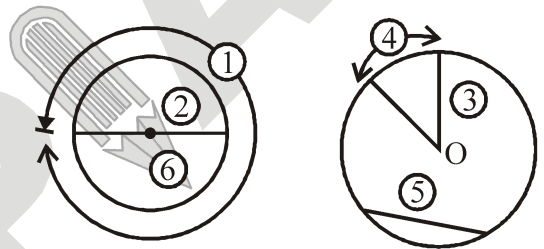


4. In the given figure, name :

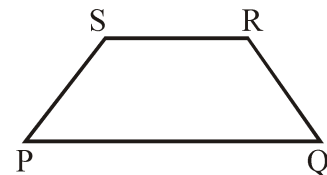


- (i) four line segments
- (ii) four rays
- (iii) two non-intersecting line segments

5. Name the six parts of the circle numbered in the diagrams below.

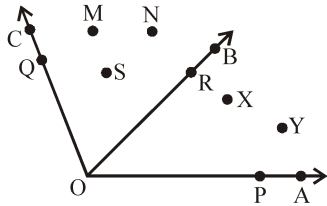


6. In the given figure, PQRS is a quadrilateral :



- (i) How many pairs of adjacent sides are there? Name them.
- (ii) How many pairs of opposite sides are there? Name them.
- (iii) How many pairs of adjacent angles are there? Name them,
- (iv) How many pairs of opposite angles are there? Name them.

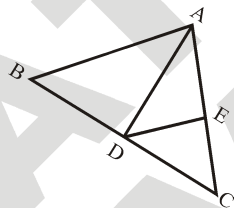
7. In the given figure,



- (i) Name the angle which contains the points M, N and S in its interior,
- (ii) Name the angle which has X and Y as points in its interior,
- (iii) Name the angle which contains the points R, S and Y in its interior,
- (iv) List the points which are in the exterior of $\angle AOB$.
- (v) List the points which are on the angle $\angle AOC$.

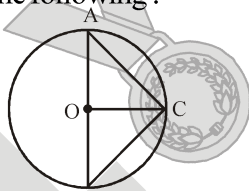
8. In the given figure name :

- (i) all the triangles
- (ii) the sides opposite to $\angle C$
- (iii) all the line segments
- (iv) the angle opposite to BC

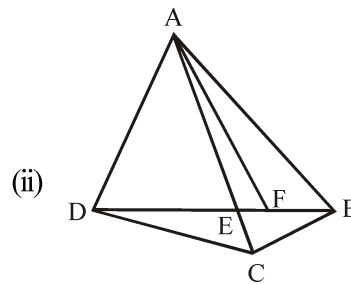
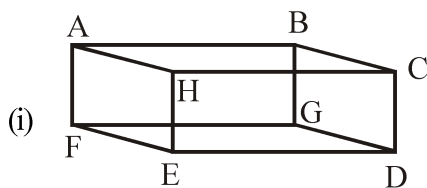


9. In the given circle, find the following :

- (i) three radii
- (ii) three chords
- (iii) a diameter
- (iv) a triangle that has the centre of the circle as vertex.

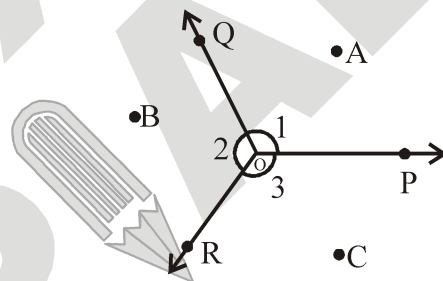


10. How many points are marked in the following figures? Name them.



LONG ANSWER TYPE

1. Rays OP, OQ and OR have a common end point O forming several angles. The angles shown are 1, 2 and 3.

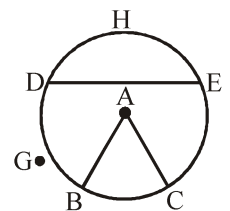


- (a) Rename the angle using alphabets.
- (b) Name two points in the exterior of angles :
 - (i) POQ
 - (ii) QOR
 - (iii) ROP
- (c) Name two points each of which lie on the angles :

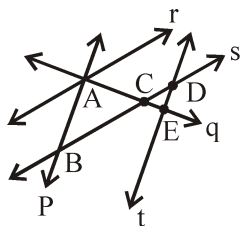
- (i) POR
- (ii) POQ

2. From the given circle, name the following

- (i) a chord
- (ii) a point in the interior and a point in the exterior
- (iii) a sector
- (iv) a segment
- (v) an arc.

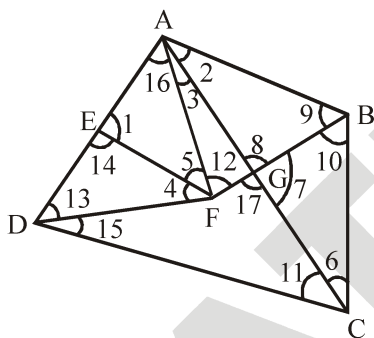


3. From the figure, name :



- (i) a line segment on s
- (ii) the line p in two other ways
- (iii) all the line segments on line q
- (iv) the line t in two other ways

4. In the given figure, name the angles indicated



- (i) $\angle 16$ (ii) $\angle 4$ (iii) $\angle 12$ (iv) $\angle 10$
- (v) $\angle 1$ (vi) $\angle 11$ (vii) $\angle 3$ (viii) $\angle 15$
- (ix) $\angle 7$ (x) $\angle 2$

5. In a ΔPQR mark

- (i) the points A, B, C on the exterior of ΔPQR
- (ii) the points X, Y, Z in the -interior of ΔPQR
- (iii) the points H, J, I on ΔPQR .

TRUE / FALSE TYPE

- 1. Only one ray can be drawn with a given initial point.
- 2. Two planes intersect in a line.
- 3. The interior of a triangle, and the triangle itself make the triangular region.
- 4. In a quadrilateral PQRS, P and R are a pair of adjacent angles.

5. The line segments joining the centre of the circle and any point on the circle are all equal.

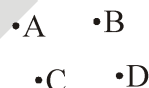
FILL IN THE BLANKS

- 1. A line segment has a _____ length
- 2. A ray has _____ end points.
- 3. A line has _____ end points.
- 4. A ray has no _____ length.
- 5. A line _____ be drawn on a paper.

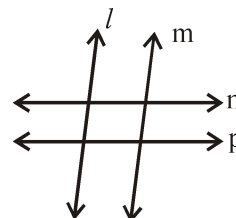
INTEGER TYPE QUESTIONS

In this section, each question, when worked out will result in one integer from 0 to 9 (both inclusive).

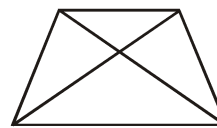
- 1. How many lines can pass through two given points?
- 2. How many Line segments will we get after joining the points A, B, C and D?



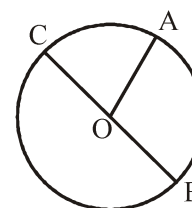
3. Count the pair of intersecting lines.



4. How many triangles are there in the given figure?



5. If $OA = 3$ cm, then find the radius OB (in cm), where O is the centre of the circle.



Answer Key

EXERCISE-I

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
B	A	A	A	A	A	C	B	B	C	A	B	C	C	C
16	17	18	19	20	21	22	23	24	25					
B	B	D	C	C	C	B	B	C	B					

EXERCISE – II

VERY SHORT ANSWER TYPE

- Number of line segment = 10 (AB, BC, CD, DA, OD, OB, OC, OA, DB, AC)
- Only (c) is a polygon as it is made up of line segments.
- $\overline{OR}, \overline{PR}, \overline{QR}$ or $\overline{PO}, \overline{QO}, \overline{RO}$
- Vertices : P, Q and R Sides : PQ, QR and RP
- (1) Open Curve (2) Closed Curve (3) Open Curve (4) Open Curve
- Pair of intersecting lines are : $l, m; l, n$
- (i) P, U, V (ii) R, S (iii) A, B, C, D, T
- (i) Collinear
- (i) $\angle EPB$ (ii) $\angle PQC$ (iii) $\angle FQD$
- (i) Points A, D and F
(ii) Points B and C
(iii) Points P, G, Q, E and R

SHORT ANSWER TYPE

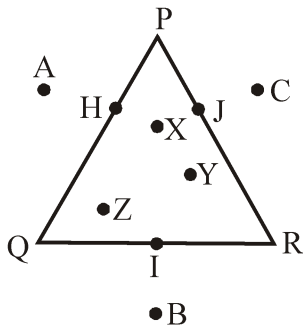
- (i) $\triangle ABC, \triangle BPQ, \triangle APQ, \triangle APC$ and $\triangle APB$ (ii) P and Q (iii) AP and PQ
- (i) O (ii) OA, OB, OC and OE (iii) AC and BE (iv) AB, BD, BE and AC
(v) Minor arcs = \widehat{AED} and \widehat{BCD}
Major arcs = \widehat{ABD} and \widehat{BDA}
- Number of angles = 6
($\angle SOR, \angle ROQ, \angle QOP, \angle SOQ, \angle ROP, \angle SOP$)
Adjacent angles : $\angle SOR, \angle ROQ; \angle ROQ, \angle QOP; \angle SOR, \angle ROP; \angle QOP, \angle SOQ.$

4. (i) $\overline{PR}, \overline{PQ}, \overline{RS}, \overline{QS}$ (ii) $\overline{PA}, \overline{QC}, \overline{RB}, \overline{SD}$ (iii) \overline{AB} and \overline{CD}
5. (i) Circumference (ii) Diameter (iii) radius; (iv) arc; (v) chord
(vi) semi-circle
6. (i) Four pairs : PQ, QR; QR, RS; RS, SP and SP, PQ.
(ii) Two pairs : PQ, RS and PS, QR
(iii) Four pairs : $\angle P, \angle Q; \angle Q, \angle R; \angle R, \angle S$ and $\angle S, \angle P$.
(iv) Two pairs : $\angle P, \angle R$ and $\angle Q, \angle S$
7. (i) $\angle BOC$ (ii) $\angle AOB$ (iii) $\angle AOC$ (iv) M, N, S, C, Q (V) P, Q, C, O, A
8. (i) $\triangle ABC, \triangle ADC, \triangle ABD, \triangle ADE, \triangle EDC$ (ii) $\overline{AB}, \overline{AD}$ and \overline{DE}
(iii) $\overline{AB}, \overline{BC}, \overline{AC}, \overline{BD}, \overline{DC}, \overline{AE}, \overline{EC}, \overline{AD}, \overline{DE}$
(iv) $\angle BAC$
9. (i) Three radii : $\overline{OA}, \overline{OB}, \overline{OC}$
(ii) Three chords : $\overline{AC}, \overline{BC}, \overline{AB}$
(iii) Diameter : \overline{AB}
(iv) A triangle that has the centre of the circle as vertex is $\triangle AOC$ and $\triangle BOC$.
10. (i) 8 points : A, B, C, D, E, F, G, H (ii) 6 points : A, B, C, D, E, F

LONG ANSWERTYPE

1. (a) $\angle POQ, \angle QOR, \angle ROP$ (b) (i) B, C (ii) A, C (iii) A, B (c) (i) P, R (ii) P, Q
2. (i) DE (ii) Interior : A Exterior : G (iii) ABC (shaded) (iv) DEHD (shaded)
(v) \widehat{BC} or \widehat{DHE}
3. (i) \overline{BC} (ii) $\overline{AB}, \overline{BA}$ (iii) $\overline{AC}, \overline{CE}, \overline{AE}$ (iv) $\overline{DE}, \overline{ED}$
4. (i) $\angle EAF$ (ii) $\angle EFD$ (iii) $\angle AFG$ (iv) $\angle GBC$ (v) $\angle AEF$ (vi) $\angle GCD$
(vii) $\angle FAG$ (viii) $\angle CDF$ (ix) $\angle BGC$ (x) $\angle GAB$

5.



TRUE / FALSE

1. F 2. T 3. T 4. F 5. T

FILL IN THE BLANKS

1. Fixed 2. One 3. No 4. Fixed 5. Cannot

NUMERICAL PROBLEMS

1. 1 2. 6 3. 4 4. 8 5. 3 6. 6
 7. 8 8. 2 9. 4 10. 2

SELF PROGRESS ASSESSMENT FRAMEWORK

(CHAPTER : BASIC GEOMETRICAL IDEAS)

CONTENT	STATUS	DATE OF COMPLETION	SELF SIGNATURE
Theory			
In-Text Examples			
Solved Examples			
NCERT Exercises			
Exercise I			
Exercise II			
Short Note-1			
Revision - 1			
Revision - 2			
Revision - 3			
Remark			

NOTES :

1. In the status, put “completed” only when you have thoroughly worked through this particular section.
2. Always remember to put down the date of completion correctly. It will help you in future at the time of revision.



Space for Notes :

A series of horizontal dotted lines providing space for writing notes.



MENSURATION (PERIMETER AND AREA)

5

Concepts

Introduction

1. *Perimeter*
2. *Perimeter of some closed figures*
3. *Area*
 - 3.1 *Area of some regular figures*
 - 3.2 *Area of irregular figures*

Solved Examples

NCERT Solutions

Exercise - I (SCQ Type)

Exercise - II (Board Pattern Type)

Answer Key

INTRODUCTION

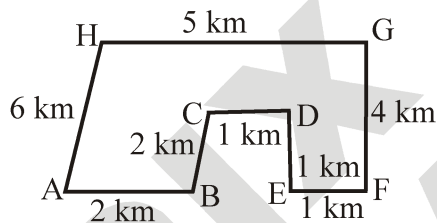
In this chapter, we introduce some concepts about the regions and boundaries of different closed shapes.

1. PERIMETER

The sum of lengths of all the sides of a closed figure or it is the distance covered in making one complete revolution along the boundary of the closed figure.

Example 1

Figure shows a plot whose dimensions are given. Find the perimeter of the plot.



Solution :

We know that perimeter of plot = sum of lengths of all its sides

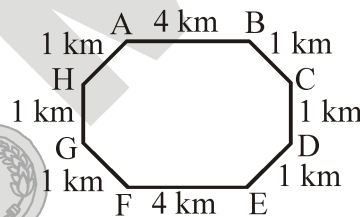
$$\Rightarrow \text{Perimeter} = AB + BC + CD + DE + EF + FG + GH + HA$$

$$= (2 + 2 + 1 + 1 + 1 + 4 + 5 + 6) \text{ km} = 22 \text{ km.}$$

\therefore Perimeter of given plot is 22 km.

Example 2

Figure shows an octagon whose dimensions are given. Find its perimeter.



Solution :

Sum of length of all sides

$$= AB + BC + CD + DE + EF + FG + GH + HA$$

$$= (4 + 1 + 1 + 1 + 4 + 1 + 1 + 1) \text{ km} = 14 \text{ km}$$

\therefore Perimeter of octagon is 14 km

2. PERIMETER OF SOME CLOSED FIGURES

1. Perimeter of rectangle = $2 \times (\text{Length} + \text{Breadth})$
2. Perimeter of square = $4 \times (\text{Side of square})$
3. Perimeter of equilateral triangle = $3 \times (\text{Side of triangle})$
4. Perimeter of n sided regular figure = $n \times (\text{Length of one side})$

Example 3

Find the perimeter of a rectangle whose length and breadth are 5m and 2m respectively.

Solution :

Length of rectangle = 5 m

Breadth of rectangle = 2 m

$$\therefore \text{Perimeter of rectangle} = 2 \times (\text{Length} + \text{Breadth}) = 2(5 + 2) = 14 \text{ m.}$$

Example 4

Find the perimeter of a triangular park if all of its side are equal and measure of a side is 3.5 m.

Solution :

Side of equilateral triangle = 3.5 m.

$$\therefore \text{Perimeter of park} = 3 \times (\text{Side}) = 3 \times 3.5 = 10.5 \text{ m}$$

Example 5

Find the perimeter (in m) of square of side 150 cm.

Solution :

Side of square = 150 cm

$$\therefore \text{Perimeter of square} = 4 \times (\text{Side}) = 4 \times 150 = 600 \text{ cm} = 6 \text{ m}$$

$$[\because 1 \text{ m} = 100 \text{ cm}]$$

Example 6

If perimeter of a regular hexagon is 108 cm, what is the length of its sides ?

Solution :

Perimeter of hexagon

$$= 6 \times (\text{length of one side})$$

$$\Rightarrow 108 = 6 \times (\text{Length of one side})$$

$$\Rightarrow \text{Length of one side} = \frac{108}{6} = 18 \text{ cm.}$$

3. AREA

Amount of plane or region enclosed by closed figure is called area.

3.1 AREA OF SOME REGULAR FIGURES

1. Area of rectangle = length \times breadth

2. Area of square = side \times side

Example 7

Find the area of a rectangle whose length is 4.8 cm and breadth is 3.2 cm.

Solution :

Area = length \times breadth = $4.8 \times 3.2 = 15.36 \text{ cm}^2$

Hence, area of rectangle is 15.36 cm^2

Example 8

A rectangular piece of cloth has area 432 cm^2 . If its length is 16 cm long, find its breadth.

Solution :

Since,

Area = Length \times Breadth

$$\therefore \text{Breadth} = \frac{\text{Area}}{\text{Length}} = \frac{432}{16} = 27 \text{ cm.}$$

Hence, breadth of the rectangular piece of cloth is 27 cm.

Example 9

What will be the area of square of side 7 cm ?

Solution :

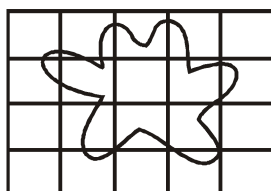
Side of the square = 7 cm

$$\therefore \text{Area} = \text{side} \times \text{side} = 7 \times 7 = 49 \text{ cm}^2$$

3.2 AREA OF IRREGULAR FIGURES

We use counting method on a square sheet of paper to find area of irregular figures.

Following steps are used to find area of irregular figures :



1. Count full squares, half squares and more than a half of squares covered by the figures.
2. Area covered by a full square and more than half of a square is counted as 1 sq. unit.

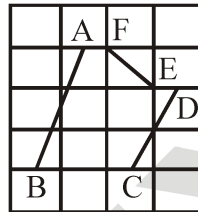
3. Area of half square is counted as $\frac{1}{2}$ sq. unit.

4. Portions that are less than half of a square are ignored.

Note : Such a convention gives a fair estimate of the desired area.

Example 10

Find area of given figure using counting method.



Solution :

Fully filled square = 2

More than half filled square = 3

Half filled square = 1

∴ Area of given figure

$$= 2 \times 1 + 3 \times 1 + 1 \times \frac{1}{2}$$

$$= 5\frac{1}{2} = \frac{11}{2} \text{ sq, units}$$

Example 11

Find the area of given figure.

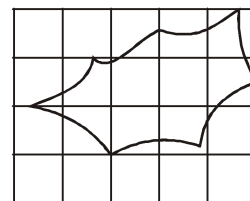
Solution :

Fully filled square = 1

More than half filled squares = 5

∴ Area of given figure

$$= 1 \times 1 + 5 \times 1 = 6 \text{ sq. units.}$$



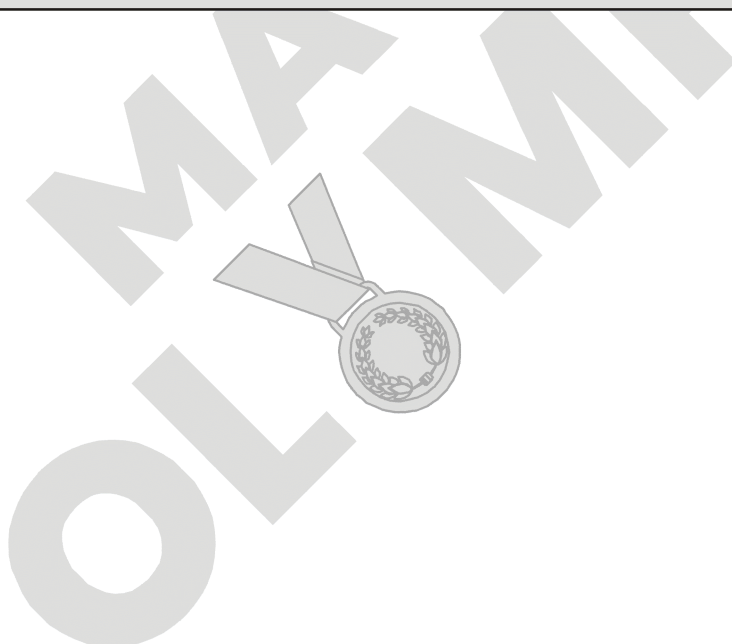


BUILD THE CONCEPT

- Perimeter is sum of lengths of all the sides of a closed figure.
- Perimeter of rectangle is $2(\text{length} + \text{breadth})$.
- Perimeter Of square is $4(\text{side of square})$.
- Perimeter of equilateral triangle is $3(\text{side of triangle})$.
- Area of a closed figure is amount of region or plane enclosed by it.
- Area of rectangle = $\text{length} \times \text{breadth}$
- Area of square = $\text{side} \times \text{side}$
- Area of irregular figures is calculated using following steps:
 - (i) Count full squares, half squares and more than a half of squares covered by the figure.
 - (ii) Area covered by a full square and more than half of a square is counted as one square unit.

While area covered by half of a square is counted as $\frac{1}{2}$ sq. unit.

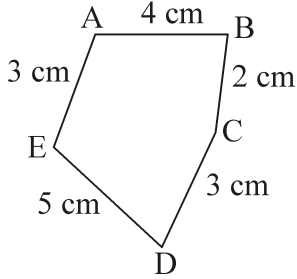
- (iii) Portions that are less than half of a square are ignored.



SOLVED EXAMPLES

SE. 1

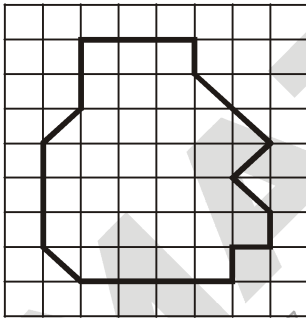
Find the perimeter of the following figure:



Ans. Perimeter of ABCDE
 $= AB + BC + CD + DE + EA$
 $= 4\text{cm} + 3\text{cm} + 2\text{cm} + 5\text{cm} + 3\text{cm} = 17$

SE. 2

Find the area of the following figure by counting squares.



Ans.

	Covered area	Number	Area estimate (in sq. units)
(I)	Full filled squares	30	$1 \times 30 = 30$
(II)	Half filled squares	6	$6 \times \frac{1}{2} = 3$
(III)	More than half	0	0
(IV)	Less than half	0	0

\therefore Total area = $30 + 3 = 33$ sq. units.

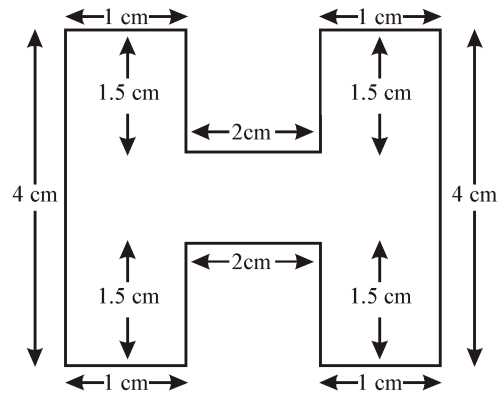
SE. 3

A rectangular field is 80m by 70m. A man walks round it at the rate of 3 km per hour. What time will he take in making 5 rounds?

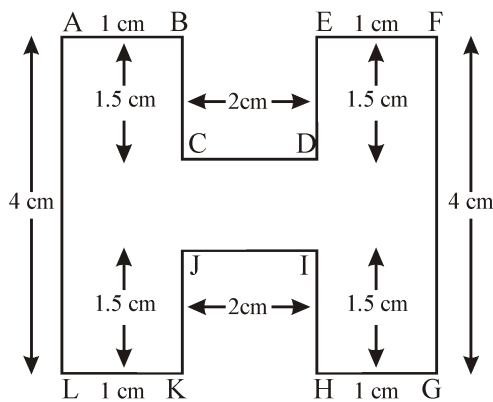
Ans. Distance covered in one round
 $=$ Perimeter of the field
 $= 2(80 + 70)\text{m} = 2 \times 150 \text{ m} = 300 \text{ m}$
 \therefore Distance covered in 5 rounds = $300 \text{ m} \times 5 = 1500 \text{ m}$
 \therefore Distance covered by the man in one hour = $3 \times 1000 \text{ m} = 3000 \text{ m}$
 \therefore Time taken by the man to cover 1500 m
 $= \frac{1}{3000} \times 1500 \text{ hour} = \frac{1}{2} \text{ hour}$
 $= \frac{1}{2} \times 60 \text{ minutes}$
 $= 30 \text{ minutes.}$

SE. 4

Split the following shape into rectangle and find the area (in sq. cm).



Ans. Splitting the given shape into rectangles ABKL, CDIJ and EFGH as shown below:



Area of rectangle ABKL = (4×1) sq. cm = 4sq. cm

Area of rectangle CDIJ = (2×1) sq. cm = 2 sq. cm

Area of rectangle EFGH = (4×1) sq. cm = 4 sq. cm

\therefore Total area = Area of ABKL + Area of CDIJ + Area of EFGH = $(4 + 2 + 4)$ sq. cm = 10 sq. cm

SE. 5

A piece of rope is 42 cm long. What will be the length of each side if the rope is used to form:

- (i) an equilateral triangle
- (ii) a regular hexagon

Ans. (i) One side of the equilateral triangle = $\text{Perimeter} \div 3 = 42 \div 3 = 14$ cm.
 (ii) One side of the regular hexagon = $\text{Perimeter} \div 6 = 42 \div 6 = 7$ cm.

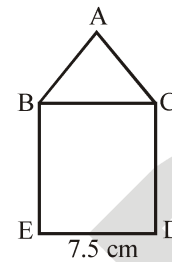
SE. 6

Find the area and the perimeter of a square each of whose sides is 6.3 cm long.

Ans. Side of the square = 6.3 cm.
 Area of the square = $(\text{Side})^2 = (6.3 \times 6.3)$ sq. cm = 39.69 sq. cm.
 Perimeter of the square = $(4 \times \text{side}) = (4 \times 6.3)$ cm = 25.2 cm.

SE. 7

Find the perimeter of the given figure: BCDE is a square and ABC is an equilateral triangle.



Ans. Side of the equilateral triangle is same as that of the square.

Sum of 3 sides of the square BCDE = $3 \times 7.5 = 22.5$ cm

Sum of 2 sides of the triangle ABC = $2 \times 7.5 = 15$ cm

Perimeter of the figure = 22.5 cm + 15 cm = 37.5 cm

SE. 8

How many marble tiles of 12 cm \times 3 cm will be needed to fit in a rectangular region of length 90 cm and breadth 40 cm?

Ans. Length = 90 cm, Breadth = 40 cm
 Area of rectangle = Length \times Breadth = $90 \times 40 = 3600$ sq. cm
 Area of one marble tile = Length \times Breadth = $12 \times 3 = 36$ sq. cm

Hence, Number of marble tiles required = $\frac{\text{Area of the rectangular region}}{\text{Area of one marble tile}} = \frac{3600}{36} = 100$
 Thus, 100 marble tiles are required to fit in a rectangular region.

SE. 9

Two plots of land have the same perimeter. One is square of side 60m while the other is a rectangle whose breadth is 15 m. Which of the plots has greater area and by how much ?

Ans. Side of the square = 60m
 \therefore Area of square = $60 \times 60 = 3600$ sq.m
 ...(i)
 Perimeter of the square = $4 \times \text{side} = 4 \times 60 = 240$ m
 Breadth of the rectangle = 15m
 \therefore Length of the rectangle = $\frac{1}{2} \times \text{perimeter} - \text{breadth}$
 $= \frac{1}{2} \times 240 \text{ m} - 15 \text{ m} = 120 \text{ m} - 15 \text{ m} = 105 \text{ m}$
 \therefore Area of the rectangle
 $= (105 \times 15) \text{ sq. m} = 1575 \text{ sq.m}$... (ii)
 From (i) and (ii), we find that the square is greater in area by $(3600) - 1575 \text{ sq. m}$ i.e., 2025 sq. m.

SE. 10

The length and the breadth of a rectangle are in the ratio 3 : 2. If its perimeter is 30 cm, find its dimensions.

Ans. Let length = $3x$ cm and breadth = $2x$ cm.
 Then, perimeter = $2(3x + 2x) \text{ cm} = (2 \times 5x) \text{ cm} = 10x \text{ cm}$.
 $\therefore 10x = 30 \Rightarrow x = \frac{30}{10} = 3$
 \therefore Length = $(3 \times 3) \text{ cm} = 9 \text{ cm}$
 Breadth = $(2 \times 3) \text{ cm} = 6 \text{ cm}$

SE. 11

Find the distance walked by Arshu if he walks three rounds of a square park of side 70 m.

Ans. Distance walked in 3 rounds
 $= 3 \times \text{Distance walked in 1 round}$
 $= 3 \times \text{Perimeter of the square park}$
 $= 3 \times (4 \times 70) \text{ m} = (3 \times 280) \text{ m} = 840 \text{ m}$

SE. 12

The length and breadth of a room are 6 m and 4 m respectively. How many square metres of carpet are required to completely cover the floor of the room? If the carpet costs Rs. 240 a square metre, how much will it cost to cover the entire room ?

Ans. Length of room = 6 m
 Breadth of room = 4 m
 Carpet needed to cover the floor of room
 $= \text{Length} \times \text{breadth} = 6 \times 4 = 24 \text{ sq. m}$
 \therefore Cost of covering the entire room
 $= 240 \times 24 = \text{Rs. } 5760$

SE. 13

The total cost of flooring a room at Rs. 8.50 per sq. metre is Rs. 510. If the length of the room is 8 metres, find its breadth.

Ans. Total cost of flooring = Rs. 510.
 Rate of flooring = Rs. 8.50 per sq. metre
 Area of the floor =
 $\left(\frac{\text{Total cost}}{\text{Rate per sq.m}} \right) = \left(\frac{510}{8.50} \right) \text{sq.m} =$
 $\left(\frac{510 \times 100}{850} \right) \text{ sq. m} = 60 \text{ sq.m}$
 Now, area = 60 sq. m and length = 8 m.
 Hence, breadth = $\left(\frac{\text{Area}}{\text{Length}} \right) = \left(\frac{60}{8} \right) \text{m} = 7.5 \text{m}$.

SE. 14

A farmer has a rectangular field which measures 350m by 240m. He hopes that by showing a variety of wheat, the yield will be 25 quintals per hectare and it will sell in the market at Rs. 160 per quintal. What will be his expected income?

Ans. Length of field = 350 m;
 Breadth of the field = 240 m
 \therefore Area of the field = $(350 \times 240)m^2 = 84000 m^2$
 $= \frac{84000}{10000} \text{ ha.} = 8.4 \text{ ha.}$ ($\because 10000 m^2 = 1 \text{ ha.}$)
 \therefore Yield per ha. = 25 quintals
 \therefore Yield from 8.4 ha. = 8.4×25 quintals = 210 quintals
 Rate of wheat = Rs. 160 per quintal
 \therefore Expected income = Rs. (160×210) = Rs. 33600.

SE. 15

A rectangular courtyard is 3 m 78 cm long and 5 m 25 cm broad. It is desired to pave it with square tiles of the same size. what is the largest size of the tile that can be used ? Also find the number of such tiles.

Ans. Length of the courtyard = 3m 78cm = 378 cm
 Breadth of the courtyard = 5 m 25cm = 525 cm
 \therefore Area to be covered with tiles = $(378 \times 525) \text{ cm}^2$
 The side of greatest square tile that can be used will be the HCF of 378 and 525.

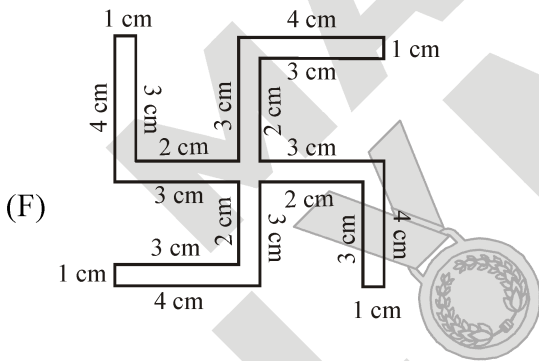
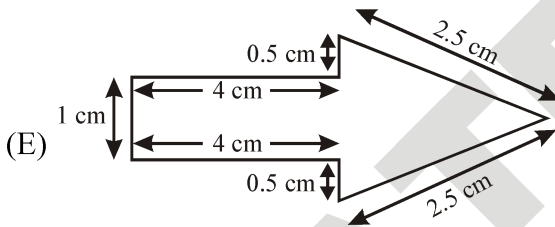
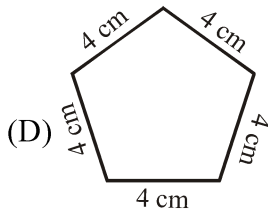
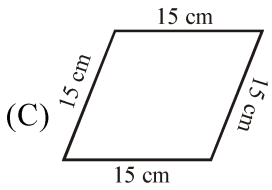
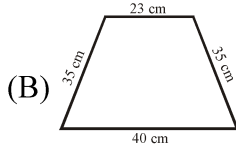
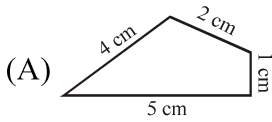
$$\begin{array}{r}
 378 \overline{) 525} \quad (1 \\
 \underline{-378} \\
 147 \quad (2 \\
 \underline{-294} \\
 84 \quad (1 \\
 \underline{-84} \\
 63 \quad (1 \\
 \underline{-63} \\
 21 \quad (3 \\
 \underline{-63} \\
 0
 \end{array}$$

\therefore HCF of 378 and 525 is 21.
 \therefore Size of the required square tile = 21 cm
 \therefore No. of tiles = $\frac{\text{Area to be covered}}{\text{Area of one tile}}$
 $= \frac{378 \times 525}{21 \times 21} = 18 \times 25 = 450$

EXERCISE - 10.1

NS. 1

Find the perimeter of each of the following figures:



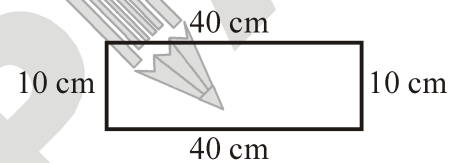
- Ans.** (A) Perimeter = Sum of all the sides
 $= 4\text{ cm} + 2\text{ cm} + 1\text{ cm} + 5\text{ cm} = 12\text{ cm}$
- (B) Perimeter = Sum of all the sides
 $= 23\text{ cm} + 35\text{ cm} + 40\text{ cm} + 35\text{ cm} = 133\text{ cm}$
- (C) Perimeter = Sum of all the sides
 $= 15\text{ cm} + 15\text{ cm} + 15\text{ cm} + 15\text{ cm} = 60\text{ cm}$
- (D) Perimeter = Sum of all the sides
 $= 4\text{ cm} + 4\text{ cm} + 4\text{ cm} + 4\text{ cm} + 4\text{ cm} = 20\text{ cm}$

(E) Perimeter = Sum of all the sides
 $= 1\text{ cm} + 4\text{ cm} + 0.5\text{ cm} + 2.5\text{ cm} + 2.5\text{ cm} + 0.5\text{ cm} + 4\text{ cm} = 15\text{ cm}$

(F) Perimeter = Sum of all the sides
 $= 4\text{ cm} + 1\text{ cm} + 3\text{ cm} + 2\text{ cm} + 3\text{ cm} + 4\text{ cm} + 1\text{ cm} + 3\text{ cm} + 2\text{ cm} + 3\text{ cm} + 4\text{ cm} + 1\text{ cm} + 3\text{ cm} + 2\text{ cm} + 3\text{ cm} = 52\text{ cm}$

NS. 2

The lid of a rectangular box of sides 40 cm by 10 cm is sealed all round with tape. What is the length of the tape required ?



Total length of tape required
 $= \text{Perimeter of rectangle}$
 $= 2 \times (\text{length} + \text{breadth})$
 $= 2 \times (40 + 10)\text{ cm}$
 $= 2 \times 50\text{ cm} = 100 = 1\text{ m}$

Thus, the total length of tape required is 100 cm or 1 m.

NS. 3

A table – top measures 2 m 25 cm by 1 m 50 cm. What is the perimeter of the table – top ?

Ans. Length of table – top = 2 m 25 cm = 2.25 m
 Breadth of table – top 1 m 50 cm = 1.50 m
 Perimeter of table – top = $2 \times (\text{length} + \text{breadth})$
 $= 2 \times (2.25 + 1.50)\text{ m} = 2 \times 3.75\text{ m} = 7.50\text{ m}$

Thus, perimeter of table – top is 7.5 m.

NS. 4

What is the length of the wooden strip required to frame a photograph of length and breadth 32 cm and 21 cm respectively ?

Ans. Length of wooden strip
 = Perimeter of photograph
 = $2 \times (\text{length} + \text{breadth})$
 = $2 \times (32 + 21) \text{ cm} = 2 \times 53 \text{ cm} = 106 \text{ cm}$
 Thus, the length of the wooden strip required is 106 cm.

NS. 5

A rectangular piece of land measures 0.7 km by 0.5 km. Each side is to be fenced with 4 rows of wires. What is the length of the wire needed?

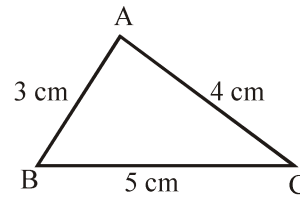
Ans. Since, 4 rows of wires are needed
 Therefore, the total length of wire is equal to 4 times the perimeter of land.
 Perimeter of land = $2 \times (\text{length} + \text{breadth})$
 = $2 \times (0.7 + 0.5) \text{ km} = (2 \times 1.2) \text{ km} = 2.4 \text{ km}$
 = $2.4 \times 1000 \text{ m} = 2400 \text{ m}$
 Thus, the length of wire
 = $4 \times 2400 \text{ m} = 9600 \text{ m} = 9.6 \text{ km}$

NS. 6

Find the perimeter of each of the following shapes:

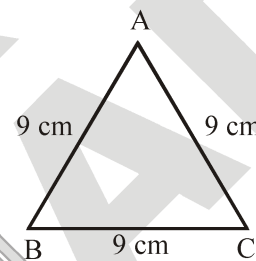
- (A) A triangle of sides 3 cm, 4 cm and 5 cm.
- (B) An equilateral triangle of side 9 cm.
- (C) An isosceles triangle with equal sides 8 cm each and third side 6 cm.

Ans. (A) Perimeter of $\triangle ABC$



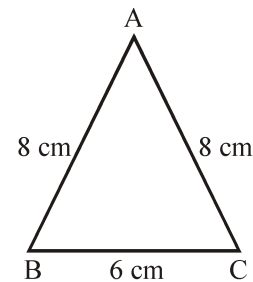
$$= AB + BC + CA = 3 \text{ cm} + 5 \text{ cm} + 4 \text{ cm} = 12 \text{ cm}$$

(B) Perimeter of equilateral $\triangle ABC$



$$= 3 \times \text{side} = 3 \times 9 \text{ cm} = 27 \text{ cm}$$

(C) Perimeter of $\triangle ABC$



$$= AB + BC + CA = 8 \text{ cm} + 6 \text{ cm} + 8 \text{ cm} = 22 \text{ cm}$$

NS. 7

Find the perimeter of a triangle with sides measuring 10 cm, 14 cm and 15 cm.

Ans. Perimeter of triangle
= Sum of all three sides
= 10 cm + 14 cm + 15 cm = 39 cm
Thus, perimeter of triangle is 39 cm.

NS. 8

Find the perimeter of a regular hexagon with each side measuring 8 m.

Ans. Perimeter of regular hexagon
= 6 × length of one side = 6 × 8 m = 48 m
Thus, the perimeter of regular hexagon is 48 m.

NS. 9

Find the side of the square whose perimeter is 20 m.

Ans. Perimeter of square = 4 × side
 $\Rightarrow 20 \text{ m} = 4 \times \text{side} \Rightarrow \text{side} = \frac{20}{4} \text{ m} = 5 \text{ m}$
Thus, the side of square is 5 m.

NS. 10

The perimeter of a regular pentagon is 100 cm. How long is its each side ?

Ans. Perimeter of regular pentagon = 5 × side
 $\Rightarrow 100 \text{ cm} = 5 \times \text{side} \Rightarrow \text{side} = \frac{100}{5} \text{ cm} = 20 \text{ cm}$
Thus, the side of regular pentagon is 20 cm.

NS. 11

A piece of string is 30 cm long. What will be the length of each side if the string is used to form:

- (A) a square?
- (B) an equilateral triangle?
- (C) a regular hexagon?

Ans. Length of string = Perimeter of each shape

(A) Perimeter of square = 4 × side
 $\Rightarrow 30 \text{ cm} = 4 \times \text{side} \Rightarrow \frac{30}{4} \text{ cm} = 7.5 \text{ cm}$

Thus, the length of each side of square will be 7.5 cm.

(B) Perimeter of equilateral triangle = 3 × side
 $\Rightarrow 30 \text{ cm} = 3 \times \text{side} \Rightarrow \text{side} = \frac{30}{3} \text{ cm} = 10 \text{ cm}$

Thus, the length of each side of equilateral triangle will be 10 cm.

(C) Perimeter of regular hexagon = 6 × side
 $\Rightarrow 30 \text{ cm} = 6 \times \text{side} \Rightarrow \text{side} = \frac{30}{6} \text{ cm} = 5 \text{ cm}$

Thus, the length of each side of regular hexagon will be 5 cm.

NS. 12

Two sides of a triangle are 12 cm and 14 cm. The perimeter of the triangle is 36 cm. What is its third side ?

Ans. Let the length of third side be x cm.
Length of other two sides are 12 cm and 14 cm.
Now, perimeter of triangle = 36 cm
 $\Rightarrow 12 + 14 + x = 36 \Rightarrow 26 + x = 36$
 $\Rightarrow x = 36 - 26 \Rightarrow x = 10$
Thus, the length of third side is 10 cm.

NS. 13

Find the cost of fencing a square park of side 250 m at the rate of Rs 20 per metre.

Ans. Side of square park = 250 m
Perimeter of square park = 4 × side
 $= 4 \times 250 \text{ m} = 1000 \text{ m}$
Since, cost of fencing for 1 metre is Rs 20
Therefore, cost of fencing for 1000 metres
 $= \text{Rs } 20 \times 1000 = \text{Rs } 20,000$

NS. 14

Find the cost of fencing a rectangular park of length 175 m and breadth 125 m at the rate of Rs 12 per metre.

Ans. Length of rectangular park = 175m
 Breadth of rectangular park = 125 m
 Perimeter of park = $2 \times (\text{length} + \text{breadth})$
 $= 2 \times (175 + 125) \text{ m}$
 $= 2 \times 300 \text{ m} = 600 \text{ m}$
 Since, cost of fencing park for 1 metre = Rs 12
 Therefore, cost of fencing park for 600 m
 $= \text{Rs } 12 \times 600 = \text{Rs } 7,200$

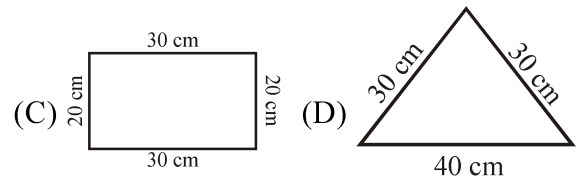
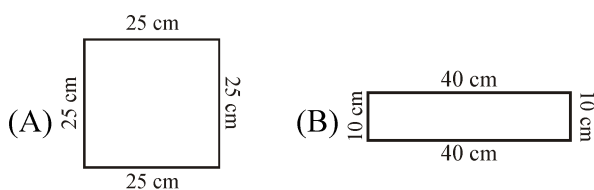
NS. 15

Sweety runs around a square park of side 75 m. Bulbul runs around a rectangular park with length 60 m and breadth 45 m. Who covers less distance ?

Ans. Distance covered by Sweety
 $= \text{Perimeter of square park} = 4 \times \text{side}$
 $= 4 \times 75 \text{ m} = 300 \text{ m}$
 Thus, distance covered by Sweety is 300 m.
 Now, distance covered by Bulbul
 $= \text{Perimeter of rectangular park}$
 $= 2 \times (\text{length} + \text{breadth})$
 $= 2 \times (60 + 45) \text{ m} = 2 \times 105 \text{ m} = 210 \text{ m}$
 Thus, Bulbul covers a distance of 210 m.
 So, Bulbul covers less distance.

NS. 16

What is the perimeter of each of the following figures ? What do you infer from the answers?

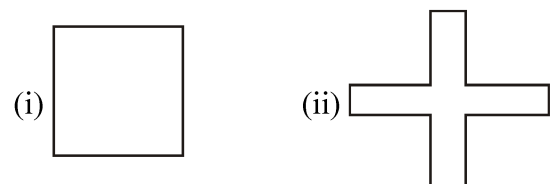


Ans. (A) Perimeter of square = $4 \times \text{side}$
 $= 4 \times 25 \text{ cm} = 100 \text{ cm}$
 (B) Perimeter of rectangle
 $= 2 \times (\text{length} + \text{breadth})$
 $= 2 \times (40 + 10) \text{ cm} = 2 \times 50 \text{ cm} = 100 \text{ cm}$
 (C) Perimeter of rectangle = $2 \times (\text{length} + \text{breadth})$
 $= 2 \times (30 + 20) \text{ cm} + 40 \text{ cm} = 100 \text{ cm}$
 (D) Perimeter of triangle = Sum of all sides
 $= 30 \text{ cm} + 30 \text{ cm} + 40 \text{ cm} = 100 \text{ cm}$
 Thus, all the figures have same perimeter.

NS. 17

Avneet buys 9 square paving slabs, each with a side of $\frac{1}{2}$ m. He lays them in the form of a square.

- (A) What is the perimeter of his arrangement [see fig. (I)] ?
- (B) Shari does not like his arrangement. She gets him to lay them out like a cross. What is the perimeter of her arrangement [see fig. (ii)] ?
- (C) Which has greater perimeter ?
- (D) Avneet wonders if there is a way of getting an even greater perimeter. Can you find a way of doing this ? (The paving slabs must meet along complete edges i.e. they cannot be broken.)



Ans. (A) Side of one square paving slab = $\frac{1}{2}$ m

\therefore Side of square formed = $\frac{3}{2}$ m

Perimeter of square = $4 \times \text{side}$
 $= 4 \times \frac{3}{2} \text{ m} = 6 \text{ m}$

(B) Perimeter of given figure

= Sum of all sides = $20 \times \frac{1}{2} \text{ m} = 10 \text{ m}$

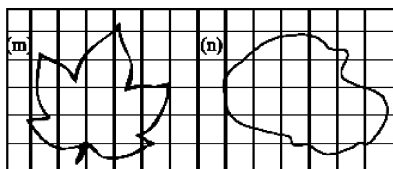
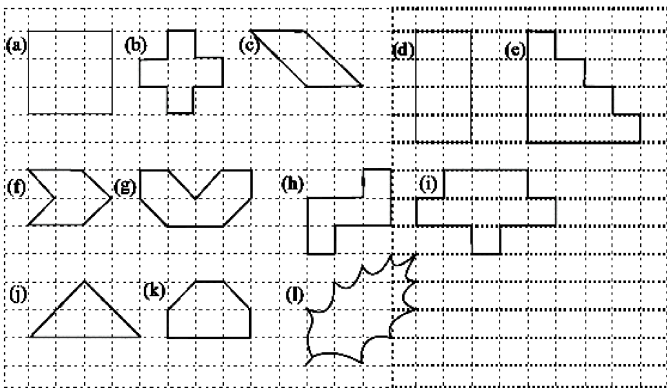
(C) The cross arrangement has greater perimeter.

(D) It is not possible to determine the arrangement with perimeter greater than 10 m.

EXERCISE - 10.2

NS. 1

Find the areas of the following figures by counting square :



Ans. (A) Number of fully – filled squares = 9
 \therefore Area covered by fully – filled squares = $(9 \times 1) \text{ sq. units} = 9 \text{ sq. units}$
 (B) Number of fully – filled squares = 5
 \therefore Area covered fully – filled squares = $(5 \times 1) \text{ sq. units} = 5 \text{ sq. units}$

(C) Number of fully – filled squares = 2
 Number of half – filled squares = 4
 \therefore Area covered by fully – filled squares = $(2 \times 1) \text{ sq. units} = 2 \text{ sq. units}$
 Area covered by half – filled squares = $\left(4 \times \frac{1}{2}\right) \text{ sq. units} = 2 \text{ sq. units}$
 \therefore Total area = $(2 + 2) \text{ sq. units} = 4 \text{ sq. units}$
 (D) Number of fully – filled squares = 8
 \therefore Area covered by fully – filled squares = $(8 \times 1) \text{ sq. units} = 8 \text{ sq. units}$
 (E) Number of fully – filled squares = 10
 \therefore Area covered by fully – filled squares = 10 sq. units
 (F) Number of fully – filled squares = 2
 Number of half – filled squares = 4
 \therefore Area covered by fully – filled squares = $(2 \times 1) \text{ sq. units} = 2 \text{ sq. units}$
 Area covered by half – filled squares = $\left(4 \times \frac{1}{2}\right) \text{ sq. units} = 2 \text{ sq. units}$
 \therefore Total area = $(2 + 2) \text{ sq. units} = 4 \text{ sq. units}$
 (G) Number of fully – filled squares = 4
 Number of half – filled squares = 4
 \therefore Area covered by fully – filled squares = $(4 \times 1) \text{ sq. units} = 4 \text{ sq. units}$
 Area covered by half – filled squares = $\left(4 \times \frac{1}{2}\right) \text{ sq. units} = 2 \text{ sq. units}$
 \therefore Total area = $(4 + 2) \text{ sq. units} = 6 \text{ sq. units}$
 (H) Number of fully – filled squares = 5
 \therefore Area covered by fully – filled squares = $(5 \times 1) \text{ sq. units} = 5 \text{ sq. units}$
 (I) Number of fully – filled squares = 9
 \therefore Area covered by fully – filled squares = $(9 \times 1) \text{ sq. units} = 9 \text{ sq. units}$

$$= (9 \times 1) \text{ sq. units} = 9 \text{ sq. units}$$

(J) Number of fully – filled squares = 2

Number of half – filled squares

$$= \left(4 \times \frac{1}{2} \right) \text{ sq. units} = 2 \text{ sq. units}$$

\therefore Total area = (2 + 2) sq. units = 4 sq. units

(K) Number of fully – filled squares = 4

Number of half – filled squares = 2

\therefore Area covered by fully – filled squares

$$= (4 \times 1) \text{ sq. units} = 4 \text{ sq. unit}$$

Area covered by half – filled squares

$$= \left(2 \times \frac{1}{2} \right) \text{ sq. units} = 1 \text{ sq. unit}$$

\therefore Total area = (4 + 1) sq. units = 5 sq. units

(L) Number of fully – filled squares = 2,

Number of half – filled squares = 0,

Number of more than half – filled squares = 6

and number of less than half – filled squares = 6.

Now, estimated area covered by

fully – filled squares = 2 sq. units,

half – filled squares = 0 sq. units

more than half – filled squares = 6 sq. units

and less than half – filled squares = 0 sq. unit

\therefore Total area = (2 + 0 + 6 + 0) sq. units = 8 sq. units.

(M) Number of fully – filled squares = 5

Number of more than half – filled squares = 9

and number of less than half – filled squares = 12

Estimated area covered by

fully – filled squares = 5 sq. units

more than half – filled squares = 9 sq. unit

and less than half filled squared = 0 sq. units.

\therefore Total area = (5 + 9 + 0) sq. units 14 sq. units.

(N) Number of fully – filled squares = 8

Number of more than half – filled squares = 10

and number of less than half – filled squares = 8

Estimated area covered by

fully – filled squares = 8 sq. units,

more than half – filled squares 10 sq. units

less than half – filled = 0 sq. unit

\therefore Total area = (8 + 10 + 0) sq. units = 18 sq. units.

EXERCISE - 10.3

NS. 1

Find the areas of the rectangles whose sides are :

(A) 3cm and 4cm

(B) 12m and 21m

(C) 2km and 3km

(D) 2m and 70cm

Ans. (A) Area of rectangle = length \times breadth
= 3cm \times 4cm = 12 cm²

(B) Area of rectangle = length \times breadth
= 12 m \times 21 m = 252 m²

(C) Area of rectangle = length \times breadth
= 2 km \times 3 km = 6 km²

(D) Area of rectangle = length \times breadth
= 2 m \times 70 cm = 2 m \times 0.7 m = 1.4 m²

NS. 2

Find the areas of the squares whose sides are :

(A) 10 cm

(B) 14 cm

(C) 5 m

Ans. (A) Area of square = side \times side
= 10 cm \times 10 cm = 100 cm²

(B) Area of squares = side \times side
= 14 cm \times 14 cm = 196 cm²

(C) Area of square = side \times side
= 5 m \times 5 m = 25 m²

NS. 3

The length and breadth of three rectangles are as given below :

- (A) 9 m and 6m (B) 17 m and 3 m
(C) 4 m and 14 m

Which one has the largest area and which one has the smallest ?

Ans. (A) Area of rectangle = length \times breadth
= 9m \times 6m = 54 m²

(B) Area of rectangle = length \times breadth
= 17 m \times 3 m = 51 m²

(C) Area of rectangle = length \times breadth
= 4 cm \times 14 m = 56 m²

Thus, rectangle (C) has the largest area, i.e. 56 m² and rectangle (B) has the smallest area, i.e. 51 m²

NS. 4

The area of a rectangular garden 50 m long is 300 sq. m. Find the width of the garden.

Ans. Length of rectangle = 50 m
Area of rectangle = 300 m²

Since, area of rectangle = length \times breadth

Therefore, breadth = $\frac{\text{area of rectangle}}{\text{length}}$

$$= \frac{300}{50} \text{ m} = 6 \text{ m}$$

Thus, the breadth of the garden is 6 m.

NS. 5

What is the cost of tiling a rectangular plot of land 500 m long and 200 m wide at the rate of Rs 8 per hundred sq. m?

Ans. Length of land = 500 m
breadth of land = 200 m
Area of land = length \times breadth
= 500 m \times 200 m = 1,00,000 sq. m
Cost of tiling 100 sq. m of land = Rs 8
 \therefore Cost of tiling 1,00,000 sq. m of land
= Rs $\frac{8 \times 100000}{100}$ = Rs 8000

NS. 6

A table – top measures 2 m by 1 m 50 cm. What is its area in square metres ?

Ans. Length of table – top = 2m
Breadth of table – top = 1m 50 cm = 1.50 m
 \therefore Area of table – top = length \times breadth
= 2m \times 1.50 m = 3 m²

NS. 7

A room is 4m long and 3m 50cm wide. How many square metres of carpet is needed to cover the floor of the room?

Ans. Length of room = 4m
And breadth of room = 3m 50cm = 3.50 m
 \therefore Area of carpet = length \times breadth
= 4m \times 3.50m = 14 m²

NS. 8

A floor is 5 m long and 4 m wide. A square carpet of side 3m is laid on the floor. Find the area of the floor that is not carpeted.

Ans. Length of floor = 5m
And breadth of floor = 4m
Area of floor = length \times breadth = 5 m \times 4m = 20 m²
Now, side of square carpet = 3m
Area of square carpet = side \times side = 3m \times 3m = 9m²
 \therefore Area of floor that is not carpeted
= 20 m² – 9m² = 11 m²

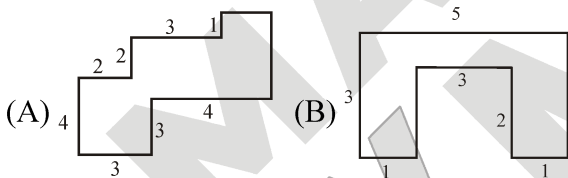
NS. 9

Five square flower beds each of sides 1 m are dug on a piece of land 5m long and 4 m wide. What is the area of the remaining part of the land?

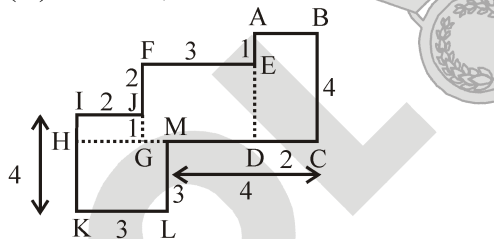
Ans. Side of square flower bed = 1 m
 Area of square flower bed = side \times side
 = 1m \times 1m = 1m²
 \therefore Area of 5 square flower beds = (1 \times 5)m² = 5m²
 Now, length of land = 5 m
 And breadth of land = 4m
 Area of land = length \times breadth = 5m \times 4m = 20m²
 \therefore Area of remaining part
 = Area of land – Area of 5 flower beds
 = 20 m² – 5m² = 15m²

NS. 10

By splitting the following figures into rectangles, find their areas (The measures are given in centimetres).

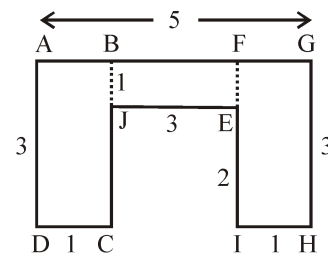


Ans. (A) We have,



Area of square HKLM = (3 \times 3) cm² = 9 cm²
 Area of rectangle IJGH = (1 \times 2) cm² = 2 cm²
 Area of square FEDG = (3 \times 3) cm² = 9cm²
 Area of rectangle ABCD = (2 \times 4) cm² = 8 cm²
 \therefore Total area of the figure
 = (9 + 2 + 9 + 8) cm² = 28cm²

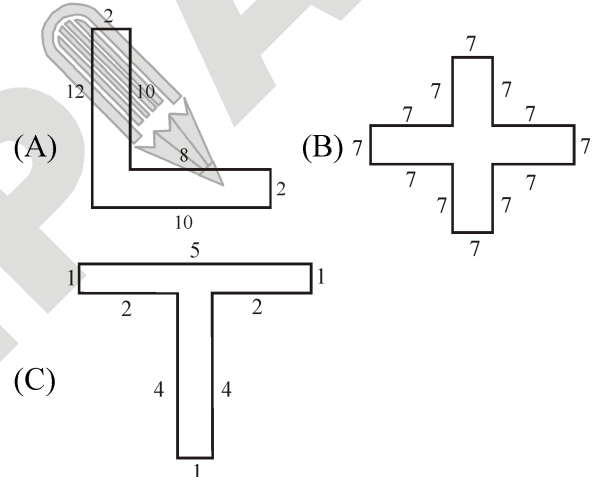
(B) We have,



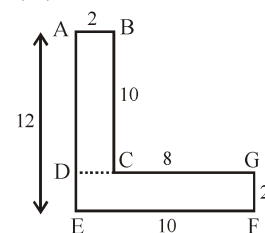
Area of rectangle ABCD = (3 \times 1) cm² = 3 cm²
 Area of rectangle BJEF = (3 \times 1) cm² = 3 cm²
 Area of rectangle FGHI = (3 \times 1) cm² = 3 cm²
 \therefore Total area of the figure = (3 + 3 + 3) cm² = 9 cm²

NS. 11

Split the following shapes into rectangles and find their areas. (The measures are given in centimetres).

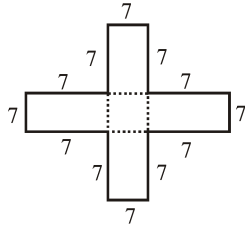


Ans. (A) We have,



Area of rectangle ABCD = (2 \times 10) cm² = 20 cm²
 Area of rectangle DEFG = (10 \times 2) cm² = 20 cm²
 \therefore Total area of the figure = Area of rectangle ABCD
 + Area of rectangle DEFG
 = (20 + 20) cm² = 40 cm²

(B) We have,

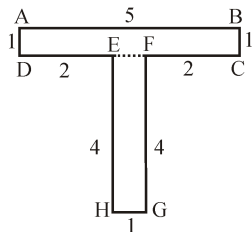


There are 5 squares each of side 7 cm.

$$\text{Area of one square} = (7 \times 7) \text{ cm}^2 = 49 \text{ cm}^2$$

$$\therefore \text{Area of 5 square} = (5 \times 49) \text{ cm}^2 = 245 \text{ cm}^2$$

(C) We have,



$$\text{Area of rectangle ABCD} = (5 \times 1) \text{ cm}^2 = 5 \text{ cm}^2$$

$$\text{Area of rectangle EFGH} = (4 \times 1) \text{ cm}^2 = 4 \text{ cm}^2$$

$$\therefore \text{Total area of the figure} = (5 + 4) \text{ cm}^2 = 9 \text{ cm}^2$$

Thus, 240 tiles are required.

(B) Area of rectangular region

$$= \text{length} \times \text{breadth} = 70 \text{ cm} \times 36 \text{ cm} = 2520 \text{ cm}^2$$

$$\text{Area of one tile} = 12 \text{ cm} \times 5 \text{ cm} = 60 \text{ cm}^2$$

\therefore Number of tiles

$$= \frac{\text{Area of rectangular region}}{\text{Area of one tile}} = \frac{2520}{60} = 42$$

Thus, 42 tiles are required.

NS. 12

How many tiles whose length and breadth are 12 cm and 5 cm respectively will be needed to fit in a rectangular region whose length and breadth are respectively :

(A) 100 cm and 144 cm

(B) 70 cm and 36 cm

Ans. (A) Area of rectangular region

$$= \text{length} \times \text{breadth} = 100 \text{ cm} \times 144 \text{ cm} = 14400 \text{ cm}^2$$

$$\text{Area of one tile} = 12 \text{ cm} \times 5 \text{ cm} = 60 \text{ cm}^2$$

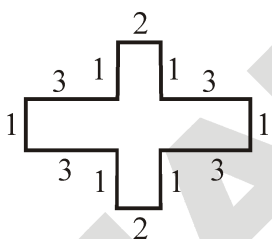
\therefore Number of tiles

$$= \frac{\text{Area of rectangular region}}{\text{Area of one tile}} = \frac{14400}{60} = 240$$

EXERCISE – I

ONLY ONE CORRECT TYPE

1. Each side of a square measures 5.6 cm. The perimeter of the square is _____.
 (A) 23.5cm (B) 22cm
 (C) 22.4cm (D) 22.4cm²
2. The area of the square of side 12 cm is _____.
 (A) 144cm (B) 144 sq.cm
 (C) 48cm (D) 48 sq.cm
3. Each side of a regular hexagon is 9.6 cm. Find its perimeter.
 (A) 57.6 sq. cm (B) 1.6 sq. cm
 (C) 1.6cm (D) 57.6cm
4. What is the perimeter of the following figure?



- (A) 24 units (B) 26 units
 (C) 12 units (D) 22 units
5. How many cm² are there in 1 m²?
 (A) 100 (B) 1000
 (C) 10 (D) 10,000
6. The distance around a closed figure is called its _____.
 (A) Volume (B) Area
 (C) Perimeter (D) None of these
7. What is the length of side of a regular pentagon having perimeter 5.35 cm?
 (A) 1.7cm (B) 26.75cm
 (C) 1.07cm (D) 107cm

8. What is the area of the rectangle with length l and breadth b ?
 (A) $2(l - b)$ (B) $2(l + b)$
 (C) $2(l \times b)$ (D) $l \times b$
9. What is the perimeter of an isosceles triangle with equal sides 9 cm each and the third side 5 cm?
 (A) 405cm (B) 23cm
 (C) 22cm (D) 69cm
10. What is the length of a rectangle with area 12.5 m² and the breadth 5 m?
 (A) 25m (B) 2.5m
 (C) 2.5m² (D) 62.5m
11. The amount of the region enclosed by a plane figure is _____.
 (A) Perimeter (B) Volume
 (C) Area (D) None of these
12. The shape whose perimeter is four times the length of its side is _____.
 (A) Pentagon (B) Hexagon
 (C) Rectangle (D) Square
13. Length of 13-sided regular figure whose perimeter is 169 cm is _____.
 (A) 13cm (B) 52cm²
 (C) 13cm² (D) 52cm
14. The perimeter of a rectangle with length l and breadth b is _____.
 (A) $2(l \times b)$ (B) $2(l - b)$
 (C) $2(l + b)$ (D) $l + b$

15. The area of a piece of cloth which is 2 m long and 1 m 30 cm wide is ____.
- (A) 330cm^2 (B) 6600cm^2
 (C) 26000cm^2 (D) 26000m^2
16. Perimeter of regular octagon is ____.
- (A) $4 \times$ length of one side
 (B) $6 \times$ length of one side
 (C) $8 \times$ length of one side
 (D) $7 \times$ length of one side
17. The cost of fencing a $15\text{ m} \times 7\text{ m}$ rectangular park at Rs.45 per metre is ____.
- (A) Rs. 4275 (B) Rs. 4,725
 (C) Rs. 1980 (D) Rs. 5427
18. If the area of a rectangle is 52.4 m^2 , then its possible dimensions are ____.
- (A) 15.1m, 4m (B) 26.2m, 4m
 (C) 15.8m, 8m (D) 13.1 m, 4 m
19. The area of a square with perimeter 40 cm is
- (A) 1600 sq. cm (B) 100 sq. cm
 (C) 10 sq. cm (D) 250 sq. cm
20. Distance covered in moving 3 rounds of square park of side 5 m is ____.
- (A) 20m (B) 60m
 (C) 15m (D) 30m
21. What is the perimeter of a regular pentagon with a side of 3.5 cm ?
- (A) 17.5cm (B) 28cm
 (C) 15cm (D) 12.25cm
22. What is the area of a square having side of 21 cm ?
- (A) 112cm^2 (B) 321cm^2
 (C) 441cm^2 (D) 121m^2
23. Which of the following is the area of the rectangle whose length is 4.2 cm and breadth is 1.3 cm ?
- (A) 6.23cm^2 (B) 11cm^2
 (C) 5.46cm^2 (D) 3.56cm^2
24. The length of each side of an equilateral triangle formed with a wire of length 96 cm is ____.
- (A) 23cm (B) 32cm
 (C) 28 cm (D) 96 cm
25. The area of a rectangle is 108 cm^2 . If its length is 12 cm. The breadth of a rectangle is ____.
- (A) 12cm (B) 19cm
 (C) 9 cm (D) 90 cm

PARAGRAPH TYPE

PASSAGE # 1

Area of a rectangle = $L \times B$

Perimeter of a rectangle = $2(L + B)$ where L and B are the length and breadth of the rectangle respectively.

26. The area of a rectangle whose length 20 cm and breadth 15 cm is
- (A) 105 cm^2 (B) 300 cm^2
 (C) 35 cm^2 (D) 30 cm^2
27. The breadth of a rectangle of length 4 m and area 8.4 m^2 is
- (A) 2.1 m (B) 1.2 m
 (C) 4.2 m^2 (D) 1.2 m^2
28. Find the area of a rectangular park whose perimeter is 300 m and breadth is 50 m.
- (A) 500 (B) 100 m
 (C) 5000 m^2 (D) 1000 m^2

PASSAGE # 2

Two plots of land have same perimeter. One is a square of side 40 m while the other is a rectangle whose breadth is 15 m.

29. What is the length of a rectangular plot ?
 (A) 65 cm (B) 160 m
 (C) 165 m (D) 65 m
30. What is the area of the square plot ?
 (A) 160 m² (B) 1600 m²
 (C) 1650 m² (D) 1720 m²
31. Which of the plots have greater area and by how much ?
 (A) Rectangle, 625 m²
 (B) Square, 825 m²
 (C) Square, 625 m²
 (D) Rectangle, 975 m²

MATCH THE FOLLOWING

In this section each question has two matching lists. Choices for the correct combination of elements from column-I and column-II are given as options (A), (B), (C) and (D) out of which one is correct.

32. Match the following.
- | | |
|--|--------------------------|
| Column-I | Column-II |
| (P) Perimeter of the square with side 8 cm | (i) 50 cm |
| (Q) Perimeter of the regular pentagon with side 10 cm = | (ii) 32 cm |
| (R) Area of square whose side is 4 cm = | (iii) 22 cm ² |
| (S) Area of a rectangle with length 5.50 cm and breadth 4 cm = | (iv) 16 cm ² |

- (A) P → ii, Q → i, R → iv, S → iii
 (B) P → i, Q → iv, R → iii, S → ii
 (C) P → ii, Q → iv, R → i, S → iii
 (D) P → iv, Q → iii, R → ii, S → i

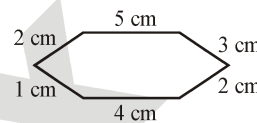
33. Match the following.

Column – I

Column – II

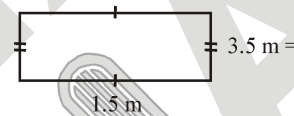
(P) Perimeter of

(i) 5.25 m²



(Q) Area of

(ii) 36 m²



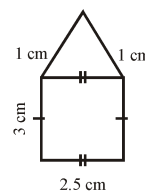
(R) Area of

(iii) 10.5 cm



(S) Perimeter of

(iv) 17 cm

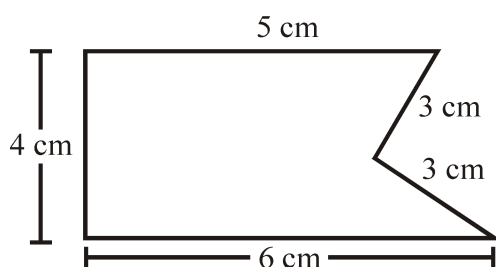


- (A) P → i, Q → ii, R → iii, S → iv
 (B) P → iv, Q → iii, R → ii, S → i
 (C) P → iv, Q → i, R → ii, S → iii
 (D) P → i, Q → iii, R → iv, S → ii

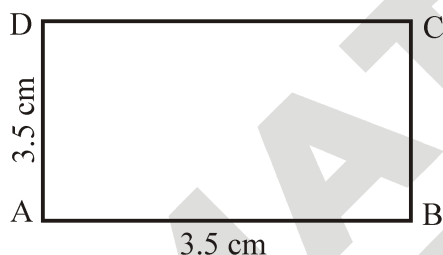
EXERCISE – II

VERY SHORT ANSWER TYPE

- Convert 563 mm^2 into cm^2 .
- What is the area of a square with each side 16 cm ?
- Find the perimeter of a regular hexagon with one side measuring 0.7 m .
- Find the perimeter of the given figure.



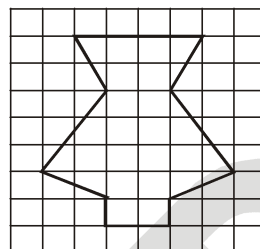
- What is the area of rectangle ABCD?



- What will be the perimeter of a 12-sided regular figure of side 12.2 m ?
- What is the distance travelled in taking five rounds of a regular octagon of side 6 cm ?
- Find the side of a square whose perimeter is 80 cm .
- Find the perimeter of an isosceles triangle with equal sides 5 cm each and unequal side 7 cm .
- Find the length of a rectangle whose area is 300 cm^2 and the breadth is 15 cm .

SHORT ANSWER TYPE

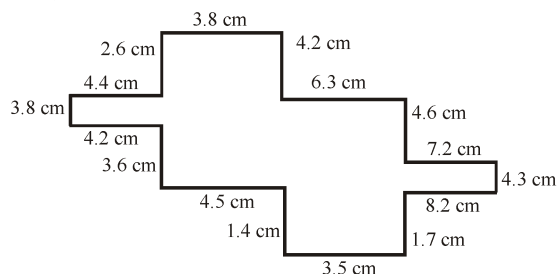
- Find the area of the following figure by counting squares.



- A tile measures $10 \text{ cm} \times 10 \text{ cm}$. How many such tiles are required to cover a wall $5 \text{ m} \times 2.5 \text{ m}$?
- Find the cost of tiling the floor of a room at the rate of Rs 8 per m^2 , where the room measure 250 m long and 100 m broad.
- What happens to the area of a square when its side is doubled?
- What is the area of a square, if its perimeter is 32 cm ?

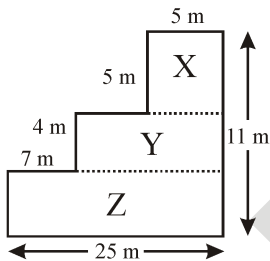
LONG ANSWER TYPE

- Find the cost of cultivating a rectangular field 34 m long and 18 m wide at Rs. 4.50 per sq. metre. Also, find the cost of fencing the field at Rs. 2.25 per metre.
- Find the perimeter of the given figure (not drawn to scale).



- The length and breadth of a play ground are $5 \text{ m } 20 \text{ cm}$ and $3 \text{ m } 80 \text{ cm}$ respectively. Find the area of the playground. Also find the cost of levelling it at Rs. 6.5 per square metre.

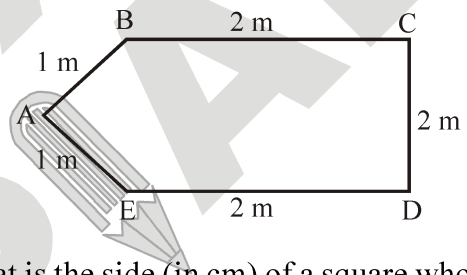
4. A rope length 60 cm is cut into two pieces. One piece is used to form a rectangle of length 12 cm and width 6 cm. The other piece is bent into a regular hexagon. What is the length of each side of the hexagon ?
5. The given shape is divided into a square and two rectangles.
 - (i) What is the area of square X?
 - (ii) What is the length of rectangle Y? What is the area of rectangle ?
 - (iii) What is the area of rectangle Z?
 - (iv) What is the area of the given shape ?



NUMERICAL PROBLEMS

In this section, each question, when worked out will result in one integer from 0 to 9 (both inclusive).

1. An athlete runs a total distance of 4800 m around a square field of side 200m. How many rounds of the field did the athlete take ?
2. An area of rectangular floor with dimensions 90 cm and 40 cm is to be paved with square tiles of side 20 cm. How many such tiles will be required ?
3. Find the perimeter (in m) of the given figure.



4. What is the side (in cm) of a square whose area is 25 cm²?
5. What is the length of side (in cm), if perimeter of a regular octagon is 40 cm?

FILL IN THE BLANKS

1. The perimeter of _____ = 3 × side
2. Side of a square = _____ of perimeter
3. 1 cm² = _____ mm²
4. Length of a side of a regular hexagon, if the perimeter is 222 mm is _____.
5. _____ sides of rectangle are equal.

TRUE/FALSE TYPE

1. The perimeter of a square of length n cm is n² cm.
2. Area of square having side 21 cm is 441 cm².
3. The length of the boundary forming a closed figure is its area.
4. The area of square – whose side 36 cm, is 144 cm².
5. The area of a rectangle equals the sum of its length and breadth.

Answer Key

EXERCISE – I

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
C	B	D	D	D	C	C	D	B	B	C	D	A	C	C
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
C	C	D	B	B	A	C	C	B	C	B	A	C	D	B
31	32	33												
C	A	C												

EXERCISE – II

VERY SHORT ANSWER TYPE

1. 5.63 cm² 2. 256cm² 3. 4.2 m 4. 21 cm 5. 12.25 cm²
 6. 146.4 m 7. 240 cm 8. 20 cm 9. 17 cm 10. 20 cm

SHORT ANSWER TYPE

1.

Covered Area	Number	Area estimate (sq. units)
Fully filled squares	16	$16 \times 1 = 16$
Half filled squares	0	0
More than half filled squares	8	$8 \times 1 = 8$
Less than half filled squares	8	$8 \times 0 = 0$

∴ Total area = 16 + 8 = 24 sq. units

2. 1250 3. Rs. 200000 4. ∴ New area is the four times the previous area. 5. 64 cm²

LONG ANSWER TYPE

1. Rs. 234 2. 68.3 cm 3. Rs. 128.44 4. 4 cm 5. (i) 25 m² (ii) 72 m²
 (iii) 50 m² (iv) 147 m²

FILL IN THE BLANKS

1. Equilateral triangle 2. $\frac{1}{4}$ 3. 100 4. 37 mm 5. Opposite

TRUE/FALSE TYPE

1. F 2. T 3. F 4. F 5. F

NUMERICAL PROBLEMS

1. 6 2. 9 3. 8 4. 5 5. 5

SELF PROGRESS ASSESSMENT FRAMEWORK

(CHAPTER : MENSURATION)

CONTENT	STATUS	DATE OF COMPLETION	SELF SIGNATURE
Theory			
In-Text Examples			
Solved Examples			
NCERT Exercises			
Exercise I			
Exercise II			
Short Note-1			
Revision - 1			
Revision - 2			
Revision - 3			
Remark			

NOTES :

1. In the status, put “completed” only when you have thoroughly worked through this particular section.
2. Always remember to put down the date of completion correctly. It will help you in future at the time of revision.



Space for Notes :

A large rectangular area containing numerous horizontal dotted lines, intended for writing notes.

