



**पुर्णमा International School**  
Shree Swaminarayan Gurukul, Zundal

*Grade -6*  
*MATHS*  
*Specimen*  
*copy*  
*Year 21-22*

# INDEX

Chapter No	Name
Chapter 1	Knowing our numbers
Chapter 2	Whole numbers
Chapter 3	Playing with numbers
Chapter 4	Basic Geometrical ideas
Chapter 6	Integers
Chapter 7	Fractions
Chapter 8	Decimal

# CHAPTER 4 BASIC GEOMETRICAL IDEAS

## KEY POINTS TO REMEMBER:

The term 'Geometry' is the English equivalent of the Greek word 'Geometron'. 'Geo' mean Earth and 'metron' means Measurement. Geometrical ideas are reflected in all forms of art, measurements, architecture, engineering, etc. We observe and use different objects. These objects have different shapes. The ruler is straight whereas a ball is round. In this chapter, we shall learn some interesting facts which enable us to know more about the shapes around us.

Let us mark a dot on the paper by a sharp tip of the pencil. Sharper the tip, thinner will be the dot. This almost invisible thinner dot gives us an idea of a point. A point determines a location. The following are some models for a point.

### A Line Segment

A line segment is the shortest join of two points. The line segment joining two points A and B is denoted by  $\overline{AB}$  or  $\overline{BA}$ . The points A and B are called the endpoints of the segment.

Note:  $\overline{AB}$  and  $\overline{BA}$  denote the same line segment.

### A Line

A line is obtained when a line segment like  $\overline{AB}$  is extended on both sides indefinitely. It is denoted by  $\overline{AB}$ . Sometimes it is denoted by a single letter like l. Although a line contains a countless number of points, yet two points are enough to determine a line. We say 'two points determine a line'.

### Intersecting Lines

Two lines are called intersecting lines if they have one common point.

### Parallel Lines

Two lines in a plane are said to be a parallel line if they do not intersect.

A ray is a portion of a line. It starts at one point (called starting point) and goes endlessly in a direction.

## Curves

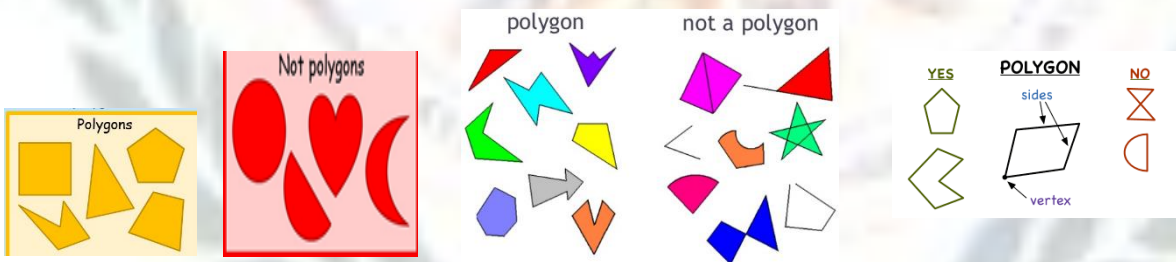
Any drawing (straight or non-straight) drawn without lifting the pencil from the paper and without the use of a ruler is called a curve. In everyday use curve means 'not straight' but in mathematics, a curve can be a straight line also. A curve is called a simple curve if it does not cross itself. A curve is said to be a closed curve if its ends are joined; otherwise, it is said to be open.

In a closed curve, there are three disjoint parts:

- Interior
- Boundary
- Exterior

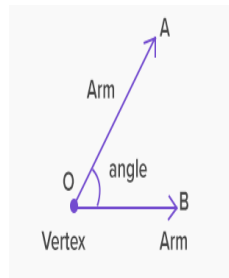
## Polygons

A polygon is a closed curve made up entirely of line segments. The line segments forming a polygon are called its sides. The meeting point of a pair of sides is called its vertex. Any two sides with a common endpoint are called the adjacent sides. The endpoints of the same side are called the adjacent vertices. The join of any two non-adjacent vertices is called a diagonal of the polygon.



## Angles

An angle is made up of two rays starting from a common endpoint. Two rays OP and OQ starting from the common endpoint O form  $\angle POQ$  (or also called  $\angle QOP$ ) at O. Point O is called the vertex of  $\angle POQ$ . Rays OP and OQ form two sides of  $\angle POQ$ . Note that in specifying an angle, the vertex is always written as the middle letter.



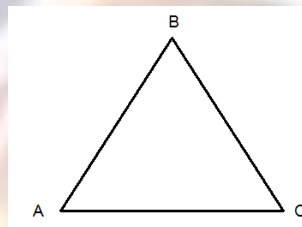
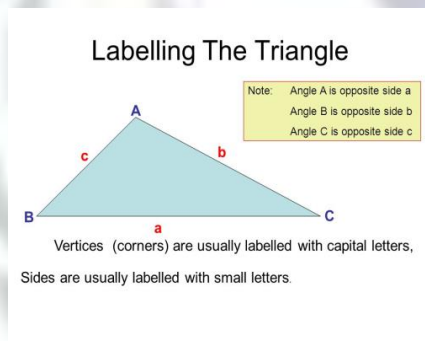
An angle leads to three divisions of a region:

On the angle

The interior of the angle

The exterior of the angle.

## Triangles



A triangle is a three-sided polygon. Actually, it is a polygon with the least number of sides. Triangle ABC is written as  $\triangle ABC$ . There are three sides of a triangle. Thus, sides of  $\triangle ABC$  are  $\overline{AB}$ ,  $\overline{BC}$  and  $\overline{CA}$ . There are three angles in a triangle. Thus, angles of  $\triangle ABC$  are  $\angle BAC$ ,  $\angle ABC$ , and  $\angle BCA$ . The points A, B, and C are called the vertices of the triangle ABC. Like angle, a triangle also has three regions associated with it.

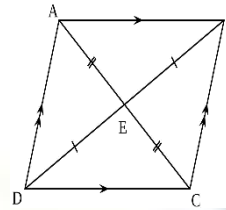
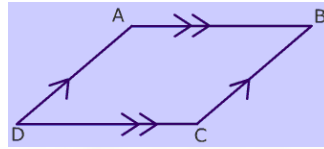
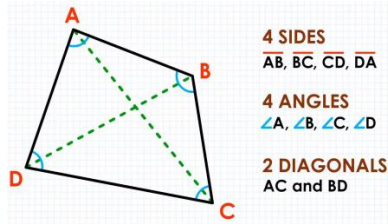
On the triangle

The interior of the triangle

The exterior of the triangle.



## Quadrilaterals



A quadrilateral is a four-sided polygon. It has 4 sides and 4 angles. A quadrilateral has 4 vertices which should be named cyclically.

In the quadrilateral ABCD,

$\overline{AB}$  ,  $\overline{BC}$  ,  $\overline{CD}$  ,  $\overline{DA}$  are the four sides

$\angle A$  ,  $\angle B$  ,  $\angle C$  ,  $\angle D$  are the four angles.

$\overline{AB}$  ,  $\overline{BC}$  ,  $\overline{CD}$

$\overline{AB}$  ,  $\overline{BC}$  ;  $\overline{BC}$  ,  $\overline{CD}$  ;  $\overline{CD}$  ,  $\overline{DA}$  ;  $\overline{DA}$  ,  $\overline{AB}$  are adjacent sides;

$\overline{AB}$  &  $\overline{DC}$  ;  $\overline{AD}$  &  $\overline{BC}$  are pairs of opposite sides;

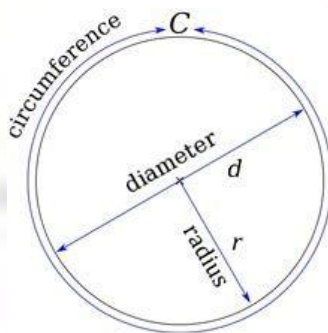
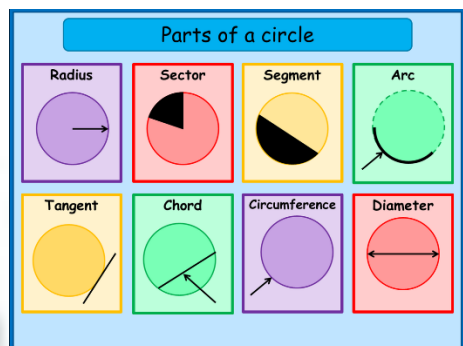
$\angle A$  &  $\angle C$  ;  $\angle B$  &  $\angle D$  are pairs of opposite angles;

$\angle A$  &  $\angle B$  ;  $\angle B$  &  $\angle C$  ;  $\angle C$  &  $\angle D$  ;  $\angle D$  &  $\angle A$  are adjacent angles.

## Circle

A circle is a path of a point moving at the same distance from a fixed point. The fixed point is called the center, the fixed distance is called the radius and the distance around the circle is called the circumference. A chord of a circle is a line segment joining any two points on the circumference. A diameter is a chord passing through the center. A diameter is double the size of a radius. Any diameter of a circle divides it into two semi-circles. Any portion of a circle is called an arc. For two points P and

Q on the circle, we get the arc PQ denoted  $\widehat{PQ}$ . Like a simple closed curve, there are three regions associated with a circle.



On the circle

The interior of the circle

The exterior of the circle.

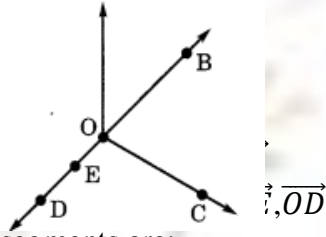
## EXERCISE 4.1

Q.1. Use the figure to name:

- (a) Five points
- (b) A line
- (c) Four rays
- (d) Five line segments

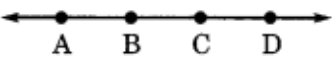
Solution:

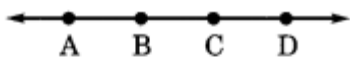
- (a) Five points are: O, B, C, E and D



- (b) Name of the line is  $\overleftrightarrow{DB}$  or  $\overleftrightarrow{BD}$
- (c) Four rays are:  $\overrightarrow{OC}$ ;  $\overrightarrow{OB}$ ;  $\overrightarrow{OE}$ ;  $\overrightarrow{OD}$
- (d) Five line segments are:  $\overline{OE}$ ;  $\overline{ED}$ ;  $\overline{OD}$ ;  $\overline{OB}$ ;  $\overline{EB}$
- (e)  $\overline{OE}$ ;  $\overline{ED}$ ;  $\overline{OD}$ ;  $\overline{OB}$ ;  $\overline{EB}$

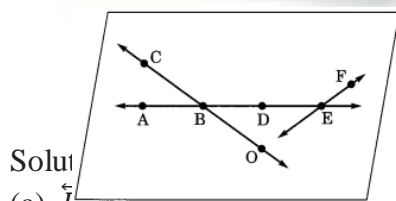
Q.2. Name the line given in all possible (twelve) ways, choosing only two letters at a time from the four given:

Solution:  named as follows:



- (i)  $\overleftrightarrow{AB}$
- (ii)  $\overleftrightarrow{AC}$
- (iii)  $\overleftrightarrow{AD}$
- (iv)  $\overleftrightarrow{BC}$
- (v)  $\overleftrightarrow{BD}$
- (vi)  $\overleftrightarrow{CD}$
- (vii)  $\overleftrightarrow{BA}$
- (viii)  $\overleftrightarrow{CA}$
- (ix)  $\overleftrightarrow{DA}$
- (x)  $\overleftrightarrow{CB}$
- (xi)  $\overleftrightarrow{DB}$
- (xii)  $\overleftrightarrow{DC}$

- (b) Line passing through A.
- (c) Line on which O lies.
- (d) Two pairs of intersecting lines.



Solution:

- (a)  $\overleftrightarrow{AE}$



- (b)  $\overleftrightarrow{AE}$
- (c)  $\overleftrightarrow{BC}$  or  $\overleftrightarrow{BO}$
- (d)  $\overleftrightarrow{CO}$  or  $\overleftrightarrow{AE}$  or  $\overleftrightarrow{AO}$  or  $\overleftrightarrow{EF}$

**Q.4. How many lines can pass through**

- (a) one given point?
- (b) two given points?

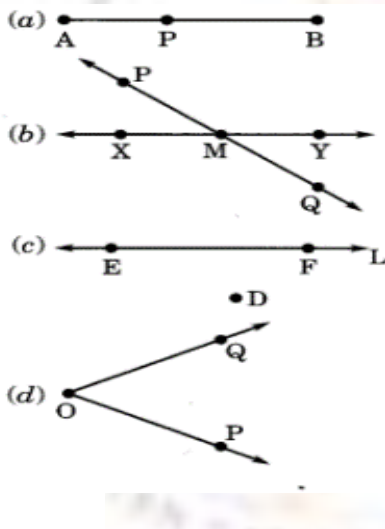
**Solution:**

- (a) Infinitely many lines can pass through a given point.
- (b) Only one line can pass through two given points.

**Q.5. Draw a rough figure and label suitably in each of the following cases:**

- (a) Point P lies on  $\overleftrightarrow{AB}$ .
- (b)  $\overleftrightarrow{XY}$  and  $\overleftrightarrow{PQ}$  intersect at M.
- (c) Line l contains E and F but not D.
- (d)  $\overleftrightarrow{OP}$  and  $\overleftrightarrow{OQ}$  meet at O.

**Solution:**



**Q.6. Consider the following in context of the**

**statements. Say whether following statements are true or false**

- 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  $\overrightarrow{OP}$ .
- (k) N is the initial point of  $\overrightarrow{NP}$  and  $\overrightarrow{NM}$ .

**Solution:**

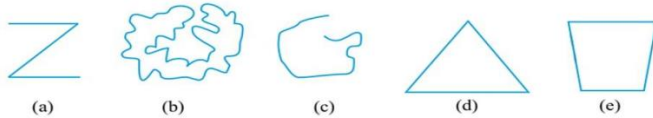
- (a) True
- (b) True

- (c) True
- (d) False
- (e) False
- (f) False
- (g) True
- (h) False
- (i) False
- (j) False
- (k) True

### Exercise 4.2

**Q.1. Classify the following curves as (i) open or (ii) closed.**

Classify the following curves as (i) Open or (ii) Closed.



- (a) Open
- (b) Closed
- (c) Open
- (d) Closed
- (e) Closed

**Closed curve**  
A curve which has no open ends

**Q.2. Draw rough diagrams to illustrate the following:**

- (a) Open curve
- (b) Closed curve

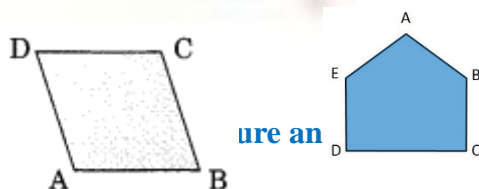
**Solution:**



**Q.3. Draw any polygon and shade its interior.**

**Solution:**

ABCDE is the required polygon.



**Q.4. Co**  
(a) Is it :

ure an : questions.

**(b) Is it closed?**

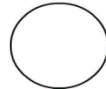


**Solution:**

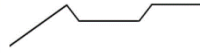
**(a) Yes, it is a curve.**

**(b) Yes, it is closed curve.**

i) A circle is a simple closed curve but not a polygon. A polygon has line segments, but a circle has only curve.



ii) Rough diagram of an open curve made up entirely of line segments.



**Q.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.**

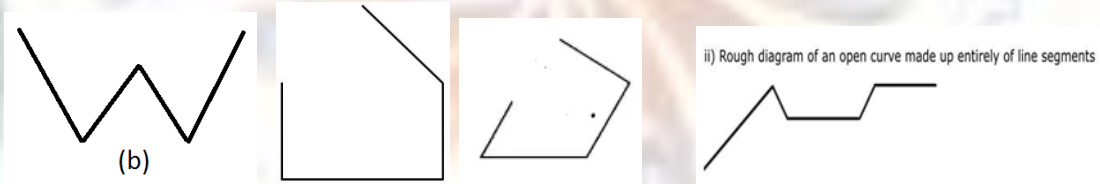
**Solution:**

**(a)**



**(b) ABCD is an open curve made up of the line segments**

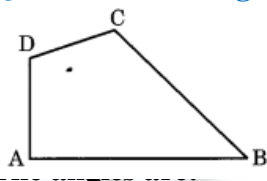
**(b)**



**(c) A polygon with two sides is not possible.**

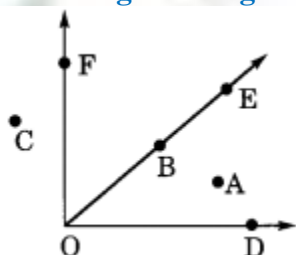
## Exercise 4.3

**Q.1. Name the angles in the given figure.**



- (i)  $\angle A$  or  $\angle DAB$
- (ii)  $\angle B$  or  $\angle CBA$
- (iii)  $\angle C$  or  $\angle DCB$
- (iv)  $\angle D$  or  $\angle ADC$ .

**Q.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  $\angle EOF$

**Solution:**

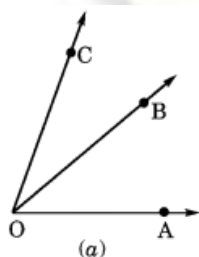
- (a) A is the point in the interior  $\angle DOE$ .
- (b) C is the point in the exterior  $\angle EOF$ .
- (c) B is the point on  $\angle EOF$ .

**Q.3. Draw rough diagrams of two angles such that they have**

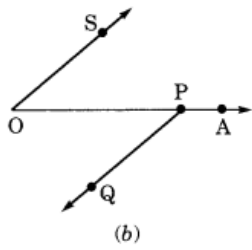
- (a) one point in common.
- (b) two points in common.
- (c) three points in common.
- (d) four points in common.
- (e) One ray in common.

**Solution:**

- (a) In figure (a), O is the common point of  $\angle AOB$  and  $\angle COB$ .

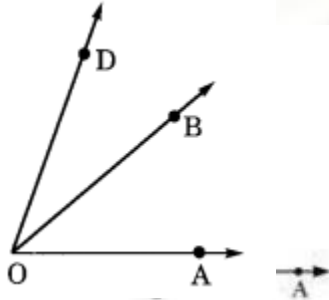


(b) In figure (b), O and P are the common points in  $\angle SOA$  and  $\angle OPQ$ .



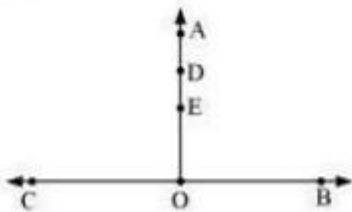
(c) Such a dia

(d) Such a diagram is not possible.



$\angle AOB$  and  $\angle BOC$  have points O, E, B in common.

(d)



$\angle BOA$  and  $\angle COA$  have points O, E, D, A in common.

(e)  $\overrightarrow{OB}$  is the common ray of  $\angle AOB$  and  $\angle DOB$ .

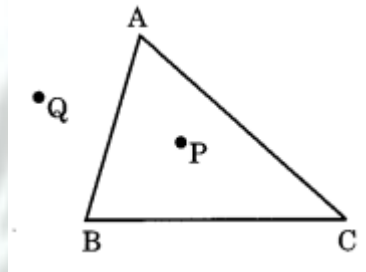


## **EXERCISE 4.4**

**Q.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?**

Solution:

Triangle ABC is the given triangle.



P is in the interior of  $\triangle ABC$ .

Q is in the exterior of  $\triangle ABC$ .

A is neither in the exterior nor in the interior.

**Q.2. (a) Identify three triangles in the figure.**

**(b) Write the names of seven angles.**

**(c) Write the names of six line segments.**

**(d) Which two triangles have  $\angle B$  as common?**

Solution:

(a) Three triangles are:  $\triangle ABC$ ,  $\triangle ABD$  and  $\triangle ADC$ .

(b) (i)  $\angle ABC$

(ii)  $\angle ADB$

(iii)  $\angle BAD$

(iv)  $\angle ADC$

(v)  $\angle ACD$

(vi)  $\angle DAC$

(vii)  $\angle BAC$ .

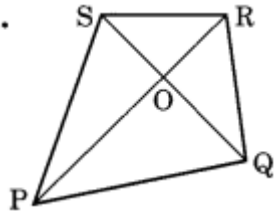
(c)  $\overline{AB}$ ;  $\overline{BD}$  ;  $\overline{AD}$  ;  $\overline{AC}$  ;  $\overline{DC}$  ;  $\overline{BC}$  ;

(d)  $\triangle ABC$  and  $\triangle ABD$  have  $\angle B$  as common.

## EXERCISE 4.5

**Q.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?**

**Solution:**



i) We have a quadrilateral PQRS.

(ii) PR and QS are its two diagonals.

(iii) O is the meeting point of the diagonals PR and QS which is in the interior of the quadrilateral.

**Q.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

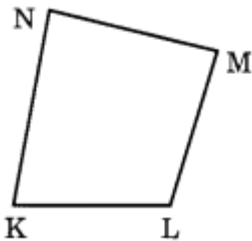
(d) two pairs of adjacent angles.

**Solution:**

KLMN is the given quadrilateral.

(a)  $\overline{KL}$  ;  $\overline{NM}$  ; and  $\overline{KN}$ ;  $\overline{LM}$  are the pairs of opposite sides.

(b)  $\angle K$  and  $\angle M$ ,  $\angle L$  and  $\angle N$  are the pairs of opposite angles.



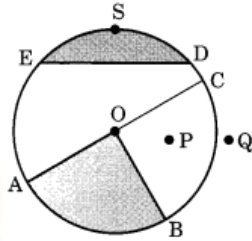
(c)  $\overline{KL}$  and  $\overline{KN}$  ;  $\overline{NM}$  and  $\overline{ML}$  are the pairs of adjacent sides OR  
OR  $\overline{KN}$  and  $\overline{NM}$  and  $\overline{ML}$  and  $\overline{KL}$  are the pairs of adjacent sides.

(d)  $\angle K$  and  $\angle L$ ,  $\angle N$  and  $\angle M$  are the pairs of adjacent angles.

## EXERCISE 4.6

**Q.1. 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.



**Solution:**

In the given figure,

- (a) O is the centre of the circle.
- (b) Three radii of the given circle are  $\overline{OA}$  ;  $\overline{OB}$  ;  $\overline{OC}$
- (c)  $\overline{AC}$  is a diameter of the circle.
- (d)  $\overline{ED}$  is a chord of the circle.
- (e) O and P are in the interior of the circle.
  - (f) Q is a point in the exterior of the circle.
  - (g) OBA is a sector of the circle.
  - (h) EDSE, the shaded region is a segment of the circle.

**Q.2.(a) Is every diameter of a circle also a chord?**

**(b) Is every chord of a circle also a diameter?**

**Solution:**

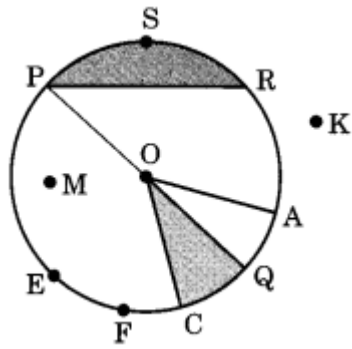
- (a) Yes, every diameter is the longest chord of a circle.
- (b) No, every chord is not diameter of a circle.

**Q.3. 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.

**Solution:**

In the given circle,



- (a) O is the center.
- (b)  $\overline{OA}$  is a radius.
- (c)  $\overline{PQ}$  is a diameter.
- (d) OQC is a sector (shaded part)
- (e) PSR (shaded part) is the segment.
- (f) M is in the interior of the circle.
- (g) K is in the exterior of the circle.
- (h)  $\widehat{EF}$  or  $\overline{EF}$  is an arc of the circle.

Q.4. Say 'true' or 'false'.

- (a) Two diameters of a circle will necessarily intersect.
- (b) The centre of a circle is always in its interior.

Solution:

- (a) True
- (b) True

## Work-Sheet

### MCQs Questions

Q. 1. How many points are enough to fix a line?

- (a) 1
- (b) 2
- (c) 3
- (d) 4

Answer (b)

Q.2. Two intersecting lines intersect in

- (a) 1 point
- (b) 2 points
- (c) 3 points
- (d) 4 points

Answer: (a)

**Q.3. How many lines can pass through one given point?**

- (a) 1
- (b) 2
- (c) 4
- (d) Countless

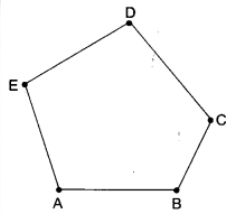
**Answer: (d)**

**Q.4. How many lines can pass through two given points?**

- (a) Only one
- (b) 2
- (c) 4
- (d) Countless

**Answer: (a)**

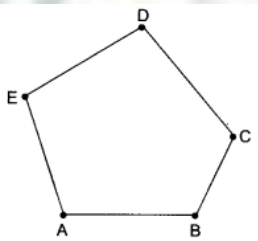
**Q.5. How many vertices are there in the following figure?**



- (a) 5
- (b) 3
- (c) 2
- (d) 4

**Answer: (a)**

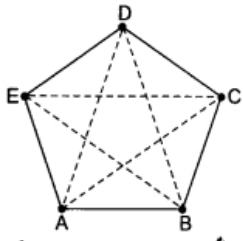
**Q.6. How many sides are there in the following figure?**



- (d) 3

**Answer: (a)**

**Q.7. How many diagonals are there in the following figure?**



© 2

- (d) 3

**Answer: (b)**



**Q.8. How many vertices are there in a triangle?**

- a) 1
- (b) 2
- (c) 3
- (d) 4


**Answer: (c)**


**Extra Questions Very Short Answer Type:**

**Q.1. Draw a rough sketch of:**

- (a) open curve
- (b) closed curve

**Solution:**

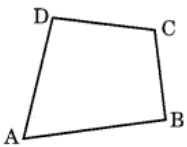
(a)  is the open curve

(b)  is the closed curve

**Q.2. Draw a rough sketch of closed curve made up of line segments.**

**Solution:**

Required curve is ABCD closed with the line segments  $\overline{AB}$  ;  $\overline{BC}$  ;  $\overline{CD}$  and  $\overline{DA}$  .



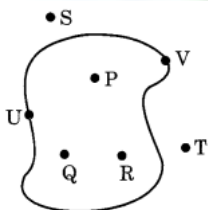
**Q.3 Draw two different angles having common point and a common arm.**

**Solution:**

$\angle AOB$  and  $\angle COB$  are two different angles with common point O and common arm  $\overline{OB}$

**Q.4. Identify the points which are:**

- (i) in the interior
- (ii) in the exterior
- (iii) on the closed curve in the given figure.



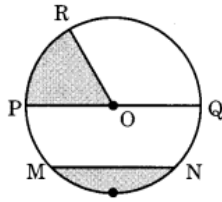
**Solution:**

- (i) Points P, Q and R are in the interior of the closed curve.

- (ii) points S and T are in the exterior of the closed curve.
- (iii) U and V are on the closed curve.

**Q.5. Identify the following in the given figure:**

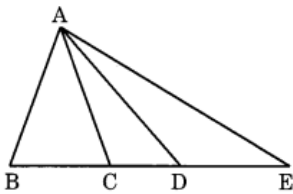
- (a) Sector
- (b) Chord
- (c) Diameter
- (d) Segment.



**Solution:**

- (a)  $\text{OPR}$  (shaded) is the sector of the circle.
- (b)  $\overline{MN}$  is the chord.
- (c)  $\overline{PQ}$  is the diameter.
- (d)  $\text{MXN}$  (shaded) is the segment.

**Q.6. In the given figure, name all the possible triangles**



**Solution.**

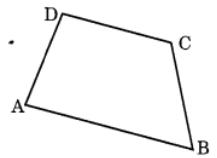
**Possible triangles are:**

- (i)  $\triangle ABC$
- (ii)  $\triangle ABD$
- (iii)  $\triangle ABE$
- (iv)  $\triangle ACD$
- (v)  $\triangle ACE$
- (vi)  $\triangle ADE$

**Q.7. Name all the angles in the given figure.**

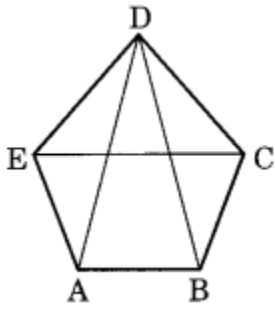
**Solution:**

**In the given figure, the names of all the angles are:**



- (i)  $\angle ABC$
- (ii)  $\angle BCD$
- (iii)  $\angle CDA$
- (iv)  $\angle DAB$

**Q.8. In the given figure, name all the line segments:**



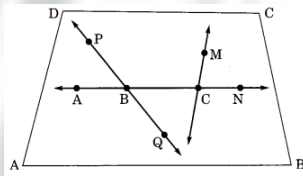
**Solution:**

In the given figure, the name of the line segments are:

$\overline{AB}$  ;  $\overline{BC}$  ;  $\overline{CD}$  ;  $\overline{DE}$  ;  $\overline{EA}$  ;  $\overline{DA}$  ;  $\overline{DB}$  ;  $\overline{EC}$

**Short Answer Type**

**Q.9. Using the given figure, name the following:**

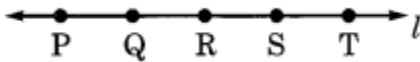


- Line containing point M.
- Line passing through four points.
- Line passing through three points.
- Two pairs of intersecting lines.

**Solution:**

- $\overleftrightarrow{MC}$  is the line containing the point M.
- $\overleftrightarrow{AN}$  is the line passing through four points A, B, C and N.
- $\overleftrightarrow{PQ}$  is the line passing through three points P, B and Q.
- Pairs for intersecting lines are
  - $\overleftrightarrow{AN}$  and  $\overleftrightarrow{PQ}$
  - $\overleftrightarrow{AN}$  and  $\overleftrightarrow{MC}$

**Q.10. On the given line, some points are given, write down the names of all segments**



**Solution:**

Segments are:

$\overline{PQ}$  ;  $\overline{PR}$  ;  $\overline{PS}$  ;  $\overline{PT}$  ;  $\overline{QR}$  ;  $\overline{QS}$  ;  $\overline{QT}$  ;  $\overline{RS}$  ;  $\overline{RT}$  ;  $\overline{ST}$

**Q.11. How many lines can pass through**

- one given point?
- two given points?
- three non-collinear points

**Solution:**

- Infinite number of lines can be passed through one given point.





# Notes

## CHAPTER – 6

### Integers

- We have seen that there are times when we need to use numbers with a negative sign. This is when we want to go below zero on the number line. These are called negative numbers. Some examples of their use can be in temperature scale, water level in lake or river, level of oil in tank etc. They are also used to denote debit account or outstanding dues.
- The collection of numbers...,  $-4, -3, -2, -1, 0, 1, 2, 3, 4, \dots$  is called integers. So,  $-1, -2, -3, -4, \dots$  called negative numbers are negative integers and  $1, 2, 3, 4, \dots$  called positive numbers are the positive integers.
- We have also seen how one more than given number gives a successor and one less than given number give predecessor.
- We observe that
  - (a) When we have the same sign, add and put the same sign.
    - (i) When two positive integers are added, we get a positive integer [e.g..  $(+3) + (+2) = +5$ ].
    - (ii) When two negative integers are added, we get a negative integer [e.g..  $(-2) + (-1) = -3$ ].
  - (b) When one positive and one negative integers are added we subtract them as whole numbers by considering the numbers without their sign and then put the sign of the bigger number with the subtraction obtained. The bigger integer is decided by ignoring the signs of the integers [e.g..  $(+4) + (-3) = +1$  and  $(-4) + (+3) = -1$ ].
  - (c) The subtraction of an integer is the same as the addition of its additive inverse.
- We have shown how addition and subtraction of integers can also be shown on a number line.



## **EX : 6.1**

**1(1).** Write opposite of Increase in weight.

**Sol.** Decrease in weight

**1(2).** Write opposite of the 30 km north.

**Sol.** 30 km south

**1(3).** Write opposite of the 80 m east.

**Sol.** The opposite is 80 m west

**1(4).** Write opposite of the Loss of ₹ 700.

**Sol.** Gain of Rs 700

**1(5).** Write opposite of the 100 m above sea level.

**Sol.** 100 m below sea level

**2(1).** Represent the number as an integer with an appropriate sign.  
An aeroplane is flying at a height two thousand metre above the ground.

**Sol.** +2000

**2(2).** Represent the number as an integer with an appropriate sign. A submarine is moving at a depth, eight hundred metre below the sea level.

**Sol.** -800

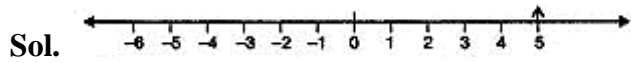
**2(3).** Represent the number as an integer with an appropriate sign.  
A deposit of rupees two hundred.

**Sol.** +200

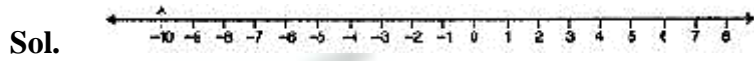
**2(4).** Represent the number as an integer with an appropriate sign.  
Withdrawal of rupees seven hundred.

**Sol.** -700

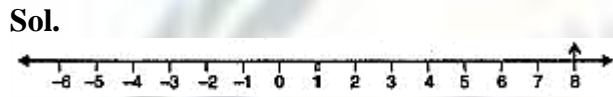
**3(1).** Represent the number on a number line: +5.



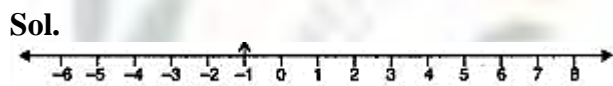
3(2). Represent the number on a number line: -10.



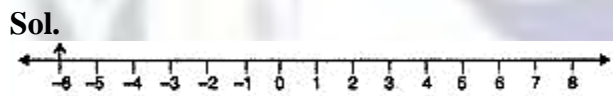
3(3). Represent the number on a number line: +8.



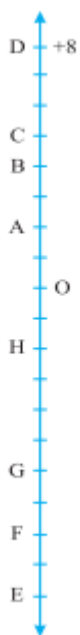
3(4). Represent the number on a number line: -1.



3(5). Represent the number on a number line: -6.



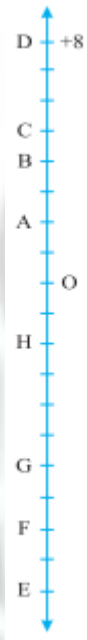
4(1). Adjacent figure is a vertical number line, representing an integer. Observe it and locate the points:  
If point D is + 8, then which point is - 8?



Sol.

Since D is +8 then,  
-8 will be a mirror image of D through 0 on the number line.  
Hence,  
According to the given vertical line,  
-8 will be the point F on the number line.

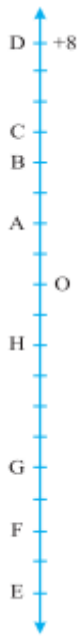
**4(2).** Adjacent figure is a vertical number line, representing an integer. Observe it and locate the points:  
Is point G a negative integer or a positive integer?



**Sol.**

The numbers that lie on the line above 0 are positive numbers  
And, The numbers that lie on the line below 0 are negative numbers  
Now, Since G lies on the line below 0  
Hence, G corresponds to (-6) and is a negative number.

**4(3).** Adjacent figure is a vertical number line, representing an integer. Observe it and locate the points:  
Write integers for points B and E.



**Sol.**

Clearly from the figure we can easily see that

Point B lies above the point 0 at a distance of 4 units

Hence, the integer for point B is 4

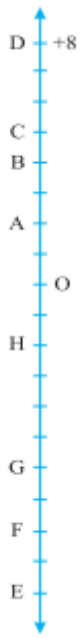
Now, point E lies below the point 0

And, it is at a distance of 10 units from 0 on lower side

Hence,

The integer for point E is -10

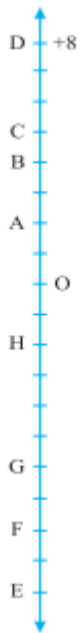
**4(4).** Adjacent figure is a vertical number line, representing an integer. Observe it and locate the points:  
Which point marked on this number line has the least value?



**Sol.**

It is clear from the figure that on the given vertical number line, E has the least value because it corresponds to -10.

**4(5).** Adjacent figure is a vertical number line, representing an integer. Observe it and locate the points: Arrange all the points in decreasing order of value.



**Sol.**



By looking at the given diagram,

We can conclude that,

The given points can be arranged in the decreasing order as shown below:

$D > C > B > A > O > H > G > F > E$

5(1). Following is the list of temperatures of five places in India on a particular day of the year.

Places	Temperature recorded	
Siachin	10°C below 0°C	_____
Shimla	2°C below 0°C	_____
Ahmedabad	30°C above 0°C	_____
Delhi	20°C above 0°C	_____
Srinagar	5°C below 0°C	_____

Write the temperatures of these places in the form of integers in the blank column.

Sol.

Places	Temperature Recorded
Siachin	-10°C
Shimla	-2°C
Ahmedabad	+30°C
Delhi	+20°C
Srinagar	-5°C

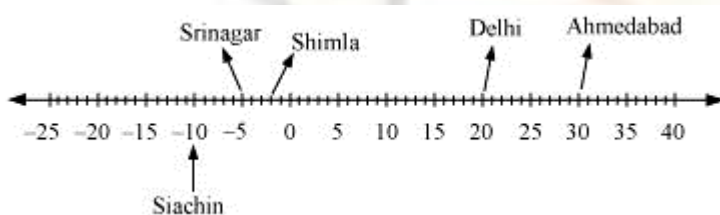
5(2). Following is the list of temperatures of five places in India on a particular day of the year.

Place	Temperature	
Siachin	10°C below 0°C	_____
Shimla	2°C below 0°C	_____
Ahmedabad	30°C above 0°C	_____
Delhi	20°C above 0°C	_____
Srinagar	5°C below 0°C	_____

Following is the number line representing the temperature in degree Celsius. Plot the name of the city against its temperature.



Sol.



5(3). Following is the list of temperatures of five places in India on a particular day of the year.

Place	Temperature	
-------	-------------	--

Siachin	10°C below 0°C	_____
Shimla	2°C below 0°C	_____
Ahmedabad	30°C above 0°C	_____
Delhi	20°C above 0°C	_____
Srinagar	5°C below 0°C	_____

Which is the coolest place?

**Sol.**

We can see that,

The temperature recorded in Siachin is  $-10^{\circ}\text{C}$ , which is the lowest.

Hence,

It is the coolest place.

**5(4).** Following is the list of temperatures of five places in India on a particular day of the year.

Place	Temperature	
Siachin	10°C below 0°C	_____
Shimla	2°C below 0°C	_____
Ahmedabad	30°C above 0°C	_____
Delhi	20°C above 0°C	_____
Srinagar	5°C below 0°C	_____

Write the names of the places where temperatures are above  $10^{\circ}\text{C}$ .

**Sol.**

We can see that,

There are two places that have recorded the temperatures more than  $10^{\circ}\text{C}$ .

These places are as follows:

Ahmedabad and Delhi.

**6(1).** In the pair 2, 9, which number is to the right of the other on the number line?

**Sol.**

The number 9 is to the right of the number 2.

**6(2).** In the pair -3, -8, which number is to the right of the other on the number line?

**Sol.**

The number  $-3$  is to the right of the number  $-8$ .

**6(3).** In the pair 0, -1, which number is to the right of the other on the number line?

**Sol.**

The number 0 is to the right of the number  $-1$ .

**6(4).** In the pair  $-11, 10$ , which number is to the right of the other on the number line?

**Sol.**

The number 10 is to the right of the number  $-11$ .

**6(5).** In the pair  $-6, 6$ , which number is to the right of the other on the number line?

**Sol.**

The number 6 is to the right of the number  $-6$ .

**6(6).** In the pair  $1, -100$ , which number is to the right of the other on the number line?

**Sol.**

The number 1 is to the right of the number  $-100$ .

**7(1).** Write all the integers between 0 and  $-7$ . (Write them in the increasing order.)

**Sol.**

The integers between 0 and  $-7$  in increasing order are  $-6, -5, -4, -3, -2$  and  $-1$ .

**7(2).** Write all the integers between  $-4$  and 4. (Write them in the increasing order.)

**Sol.**

The integers between  $-4$  and 4 in increasing order are  $-3, -2, -1, 0, 1, 2$  and 3.

**7(3).** Write all the integers between  $-8$  and  $-15$ . (Write them in the increasing order.)

**Sol.**

The integers between  $-8$  and  $-15$  in increasing order are  $-14, -13, -12, -11, -10$  and  $-9$ .

**7(4).** Write all the integers between  $-30$  and  $-23$ . (Write them in the increasing order.)

**Sol.**

The integers between  $-30$  and  $-23$  in increasing order are  $-29, -28, -27, -26, -25$  and  $-24$ .

**8(1).** Write four negative integers greater than  $-20$ .

**Sol.**

Four negative integers greater than  $-20$  are  $-19, -18, -17$  and  $-16$

**8(2).** Write four integers less than  $-10$ .

**Sol.**

Four negative integers less than  $-10$  are as follows:

$-12, -13, -14, -15$

**9(1).**  $-8$  is to the right of  $-10$  on a number line.

- 1) True
- 2) False

**Sol. 1)** True

True

**9(2).**  $-100$  is to the right of  $-50$  on a number line.

- 1) True
- 2) False

**Sol. 2)** False

False

**9(3).** Smallest negative integer is  $-1$ .

- 1) True
- 2) False

**Sol. 2)** False

False.

As the greatest negative number is  $-1$

**9(4).**  $-26$  is greater than  $-25$ .

- 1) True
- 2) False

**Sol. 2)** False

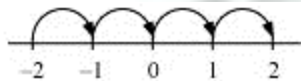
False.

On the number line  $-26$  is smaller than  $-25$ .

**10(1).** Draw a number line and answer the given statement:

Which number will we reach if we move 4 numbers to the right of  $-2$ .

**Sol.**

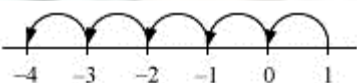


If we move 4 numbers to the right of  $-2$ , then we will reach number  $2$ .

**10(2).** Draw a number line and answer the given statement:

Which number will we reach if we move 5 numbers to the left of  $1$ .

**Sol.**

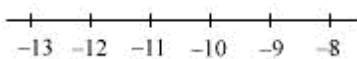


If we move 5 numbers to the left of  $1$ , we will reach the number  $-4$ .

**10(3).** Draw a number line and answer the given statement:

If we are at  $-8$  on the number line, in which direction should we move to reach  $-13$ ?

**Sol.**



From the figure we can observe that,

$-13$  is to the left of  $-8$

Hence, we should move towards the left direction.

**10(4).** Draw a number line and answer the given statement:

If we are at  $-6$  on the number line, in which direction should we move to reach  $-1$ ?

**Sol.**



Here from the figure above, we can observe that,

$-1$  is to the right of  $-6$

Hence, we should move towards the right direction.

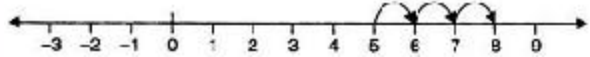


## Ex : 6.2

1(1). Using number line write the integer which is 3 more than 5.

**Sol.**

We will start from 5 and proceed 3 steps to the right of 5 to reach 8 as shown below :

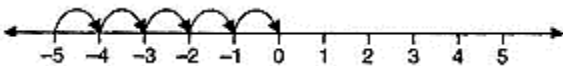


Therefore, 3 more than 5 is 8.

1(2). Using number line write the integer which is 5 more than -5.

**Sol.**

We will start from -5 and move to the right by 5 steps and obtain 0 as shown below:

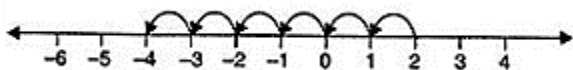


Therefore, 5 more than -5 is 0.

1(3). Using number line write the integer which is 6 less than 2.

**Sol.**

We will start from 2 and move 6 steps to the left of 2 to reach -4 as shown below:

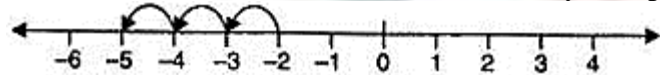


Therefore, 6 less than 2 is -4.

1(4). Using number line write the integer which is 3 less than -2.

**Sol.**

We will start from -2 and move to the left by 3 steps to reach -5 as shown below :



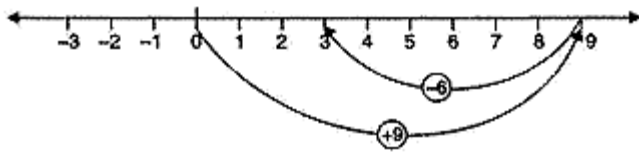
Therefore, 3 less than -2 is -5.

2(1). Use number line and add the integers:  $9 + (-6)$ .

**Sol.**

On the number line we first move 9 steps to the right from 0 reaching 9 and then we move 6 steps to the left of 9 and reach 3.

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

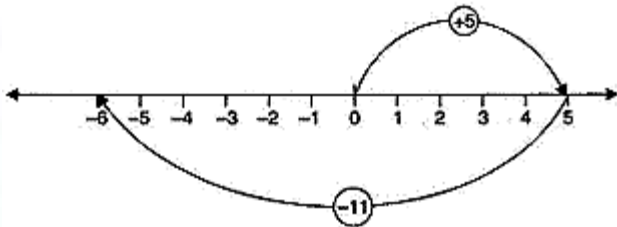


2(2). Use number line and add the integers:  $5 + (-11)$

**Sol.**

On the number line we first move 5 steps to the right from 0 reaching 5 and then we move 11 steps to the left of 5 to reach -6.

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

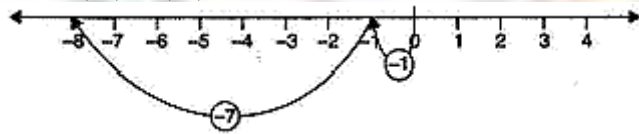


2(3). Use number line and add the integers:  $(-1) + (-7)$ .

**Sol.**

On the number line we first move 1 step to the left of 0 reaching -1, then we move 7 steps to the left of -1 and reach -8.

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

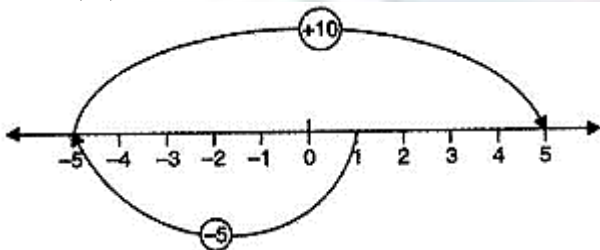


2(4). Use number line and add the integers:  $(-5) + 10$

**Sol.**

First we move 5 steps to the left of 0 reaching -5, then from -5 we move 10 steps to the right. We reach the point +5.

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

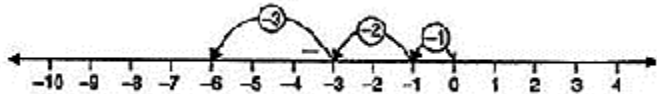


2(5). Use number line and add the integers:  $(-1) + (-2) + (-3)$

**Sol.**

First, we move 1 step to the left of 0 reaching -1, then from -1 we move 2 steps to the left to reach -3 and finally from -3 we move 3 steps to the left. We reach the point -6.

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

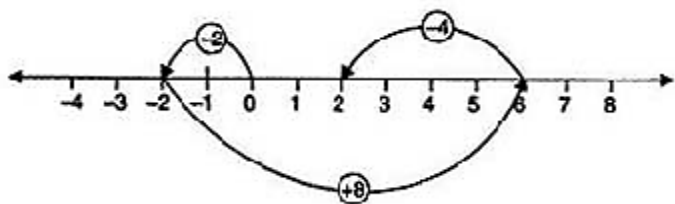


2(6). Use number line and add the integers:  $(-2) + 8 + (-4)$

**Sol.**

First, we move 2 steps to the left of 0 reaching -2, then from -2 we move 8 steps to the right to reach +6 and finally from +6 we move 4 steps to the left. We reach the point 2.

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



3(1). Add without using number line :  $11 + (-7)$

**Sol.**

$$\begin{aligned} 11 + (-7) \\ = 4 + 7 + (-7) \\ = 4 + 0 = 4 \end{aligned}$$

3(2). Add without using number line :  $(-13) + (+18)$

**Sol.**

$$\begin{aligned} (-13) + (+18) \\ = (-13) + (+13) + (+5) \\ = 0 + (+5) = 5 \end{aligned}$$

3(3). Add without using number line :  $(-10) + (+19)$

**Sol.**

$$\begin{aligned} &(-10) + (+19) \\ &= (-10) + (+10) + (+9) \\ &= 0 + (+9) = 9 \end{aligned}$$

**3(4).** Add without using number line :  $(-250) + (+150)$

**Sol.**

$$\begin{aligned} &(-250) + (+150) \\ &= (-100) + (-150) + (+150) \\ &= (-100) + 0 = -100 \end{aligned}$$

**3(5).** Add without using number line :  $(-380) + (-270)$

**Sol.**

$$\begin{aligned} &(-380) + (-270) \\ &= -650 \end{aligned}$$

**3(6).** Add without using number line :  $(-217) + (-100)$

**Sol.**

$$\begin{aligned} &(-217) + (-100) \\ &= -317 \end{aligned}$$

**4(1).** Find the sum of : 137 and  $-354$

**Sol.**

$$\begin{aligned} &137 + (-354) \\ &= 137 + (-137) + (-217) \\ &= 0 + (-217) = -217 \end{aligned}$$

**4(2).** Find the sum of :  $-52$  and  $52$

**Sol.**

$$\begin{aligned} &-52 + (52) \\ &= 0 \end{aligned}$$

**4(3).** Find the sum of :  $-312$ ,  $39$  and  $192$

**Sol.**

$$\begin{aligned} &(-312) + (39) + (192) \\ &= (-312) + (231) \end{aligned}$$

$$\begin{aligned} &= (-81) + (-231) + (231) \\ &= (-81) + 0 = -81 \end{aligned}$$

**4(4).** Find the sum of  $-50$ ,  $-200$  and  $300$

**Sol.**

$$\begin{aligned} &(-50) + (-200) + (300) \\ &= (-250) + (300) \\ &= (-250) + (250) + (50) \\ &= 0 + (50) = 50. \end{aligned}$$

**5(1).** Find the sum:  $(-7) + (-9) + 4 + 16$

**Sol.**

The sum of given numbers is obtained as follows:

$$\begin{aligned} &= (-7) + (-9) + 4 + 16 \\ &= -7 - 9 + 4 + 16 \\ &= -16 + 20 \\ &= 4 \end{aligned}$$

Therefore, sum is 4.

**5(2).** Find the sum:  $(37) + (-2) + (-65) + (-8)$

**Sol.**

The required sum of given numbers is:

$$\begin{aligned} &= 37 + (-2) + (-65) + (-8) \\ &= 37 - 2 - 65 - 8 \\ &= 37 - 67 - 8 \\ &= 37 - 75 \\ &= -38 \end{aligned}$$

Therefore, sum is  $-38$ .



## Ex : 6.3

**1(1).** Find  $35 - (20)$

**Sol.**

$$\begin{aligned} & 35 - (20) \\ &= 35 - 20 \\ &= 15 \end{aligned}$$

Hence, the result is 15.

**1(2).** Find  $72 - 90$

**Sol.**

$$\begin{aligned} & 72 - 90 \\ &= 72 + (\text{additive inverse of } 90) \\ &= 72 + (-90) \\ &= 72 + (-72) + (-18) \\ &= 0 + (-18) = -18 \end{aligned}$$

**1(3).** Find  $(-15) - (-18)$

**Sol.**

$$\begin{aligned} & (-15) - (-18) \\ &= (-15) + (\text{additive inverse of } -18) \\ &= (-15) + (18) \\ &= (-15) + (15) + (3) \\ &= 0 + (3) = 3 \end{aligned}$$

**1(4).** Find  $(-20) - (-13)$

**Sol.**

$$\begin{aligned} & (-20) - (-13) \\ &= (-20) + (\text{additive inverse of } -13) \\ &= (-20) + (13) = -7 \end{aligned}$$

**1(5).** Find  $23 - (-12)$

**Sol.**

$$\begin{aligned} &23 - (-12) \\ &= 23 + (\text{additive inverse of } -12) \\ &= 23 + 12 = 35 \end{aligned}$$

**1(6).** Find  $(-32) - (-40)$

**Sol.**

$$\begin{aligned} &(-32) - (-40) \\ &= (-32) + (\text{additive inverse of } -40) \\ &= (-32) + (+40) \\ &= (-32) + (+32) + (+8) \\ &= 0 + (+8) = 8. \end{aligned}$$

**2(1).**  $(-3) + (-6)$  \_\_\_\_\_  $(-3) - (-6)$ . ( $>$ ,  $<$  or  $=$ )

**Sol 1.**  $<$

**2(2).**  $(-21) - (-10)$  \_\_\_\_\_  $(-31) + (-11)$ . ( $>$ ,  $<$  or  $=$ )

**Sol 1.**  $>$

**2(3).**  $45 - (-11)$  \_\_\_\_\_  $57 + (-4)$ . ( $>$ ,  $<$  or  $=$ )

**Sol 1.**  $>$

**2(4).**  $(-25) - (-42)$  \_\_\_\_\_  $(-42) - (-25)$ . ( $>$ ,  $<$  or  $=$ )

**Sol 1.**  $>$

**3(1).**  $(-8) +$  \_\_\_\_\_  $= 0$

**Sol 1.** 8

**3(2).**  $13 +$  \_\_\_\_\_  $= 0$

**Sol 1.** -13

**3(3).**  $12 + (-12) =$  \_\_\_\_\_

**Sol 1.** 0

**3(4).**  $(-4) +$  \_\_\_\_\_  $= -12$

**Sol 1.** - 8

**3(5).** \_\_\_\_\_  $- 15 = - 10$

**Sol 1. 5**

**4(1).** Find  $(-7) - 8 - (-25)$

**Sol.**  $(-7) - 8 - (-25)$

$$\begin{aligned} &= (-7) + (\text{additive inverse of } 8) - (-25) \\ &= (-7) + (-8) - (-25) \\ &= -15 - (-25) \\ &= -15 + (\text{additive inverse of } -25) \\ &= -15 + (+25) \\ &= -15 + (+15) + (+10) \\ &= 0 + (+10) = 10 \end{aligned}$$

**4(2).** Find  $(-13) + 32 - 8 - 1$

**Sol.**  $(-13) + 32 - 8 - 1$

$$\begin{aligned} &= (-13) + 32 - 9 \\ &= (-13) + 32 + (\text{additive inverse of } 9) \\ &= (-13) + 32 + (-9) \\ &= (-13) + 23 + 9 + (-9) \\ &= (-13) + 23 + 0 \\ &= (-13) + 23 \\ &= (-13) + 13 + 10 \\ &= 0 + 10 = 10 \end{aligned}$$

**4(3).** Find  $(-7) + (-8) + (-90)$

**Sol.**  $(-7) + (-8) + (-90)$

$$\begin{aligned} &= (-15) + (-90) \\ &= -105 \end{aligned}$$

**4(4).** Find  $50 - (-40) - (-2)$

**Sol.**

$$\begin{aligned} &50 - (-40) - (-2) \\ &= 50 + (\text{additive inverse of } -40) - (-2) \\ &= 50 + (40) - (-2) \\ &= 90 - (-2) \\ &= 90 + (\text{additive inverse of } -2) \\ &= 90 + 2 = 92. \end{aligned}$$

# Worksheet

## Ch-6

### Integers

1. Write numbers with appropriate signs: 40°C below 0°C temperature.

- a. 30
- b. 40
- c. -40
- d. None of these

2. 2 subtracted from 7 gives

- a. -5
- b. 5
- c. -9
- d. 9

3. Fill in the blanks with  $>$ ,  $<$  or  $=$  sign.  $(-3) + (-6)$  \_\_\_\_\_  $(-3) - (-6)$

- a.  $<$
- b.  $>$
- c. None of these
- d.  $=$

4. The number of integers between -2 and 2 is

- a. 3
- b. 5
- c. 4
- d. 2

5. Sum of  $(-9)$  and 15.

- a. 90
- b. -6
- c. 6
- d. 20

6. Match the following:

Column A	Column B
(a) 10 steps to the right	(p) -1000
(b) 10 km below sea level	(q) 1000
(c) Deposit Rs. 1000 in a bank	(r) 10
(d) Spending Rs. 1000	(s) -10

**7. Fill in the blanks:**

- a. When we subtract -10 from 18 we get \_\_\_\_\_.
- b. \_\_\_\_\_ is an integer which is neither positive nor negative.
- c.  $272 - 198 - \underline{\hspace{2cm}} = 0$ .
- d.  $15 + \underline{\hspace{2cm}} = 0$

**8. State whether the following statements are true or false:**

- a. If a and b are any two integers such that  $a > b$ , then  $-a > -b$ .
  - b. If the sum of an integer and its opposite is zero, then they are called additive inverses of each other.
  - c. The negative of 0 is -0.
  - d. The sum of positive and negative integers is always negative.
9. Write four negative integers less than -20.
10. Write all the integers between -8 and -15. (Write them in the increasing order.)
11. Find the solution of the following :  $(-9) + (+13)$
12. Subtract :  $(-20) - (-13)$
13. Find the value of :  $(-7) + (-9) + 4 + 16$
14. Using number line, add the following integers:  $9 + (-6)$ .
15. The temperature on a certain morning is  $-11^{\circ}\text{C}$  at 5 a. m. If the temperature drops 3 degree at 6 a.m. and rises 5 degree at 8 a.m. and again drops 3 degree at 9 a.m. What is the temperature at 9 a.m.?