LINES AND ANGLES

LEARNING OBJECTIVES:

1. Basic Geometrical Concepts
2. Line Segment
3. Lines and Angles
4. Parallel Lines and Transversal
5. Intercept and Its Properties

§§ Basic Geometrical Concepts

Ψ **Point:** A fine dot marked with a sharp edged pencil represents a point. It has no length, breadth and thickness. Points are denoted by capital letters like A,B,C etc., Geometrically a point is an undefined term.

Ψ **Dimension of Point:** A point has no dimensions point has no thickness or size, generally we should keep a dot as thin as possible to represent a point.

Example: A person travelling along a straight path from Miyapur to Chintal, can be represented diagramatically as the first dot on the line named as point 'T' represnts Miyapur, the second dot 'P' represents a person and the third dot name as 'H' represents Chintal.

Ψ **Line:** Mark two points A and B on a plain white paper and join them with the help of a ruler and pencil you get the adjoint figure

This line segment AB is formed by joining the two points A and B. That means this has two end points.

Observe the two adjacent figures:

by extending the line, segment $\overleftrightarrow{AB}$ on either side figure (ii) is formed . We read this $\overleftrightarrow{AB}$ as "line AB" simply a line segment extended endlesly in both the directions is called a "line". Some times a line is represented by a small letter l,m,n,....etc., 

Ψ **Collinear Points:** The points lying on the same line are called collinear points.

Exmpale: If $\overline{AB}$ = 3cm, $\overline{BC}$ =4cm, the length of $\overline{AC}$ must be 7cm

That means $\overline{AB} + \overline{BC} = \overline{AC}$ 

, Therefore point 'B' must be in between A and C such points are called collinear points.

Ψ **Line: (Note)** 1) A Line has no end points

2) A line contains infinite number of points

3) A line has length but no thickness.

4) The line segment is a part of line

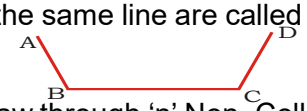
Exmpale: Four points A,B,C, and D are marked on the following line

Here the points A,B,C,&D are lying on the same line or the

line is passing through these points .Hence A,B,C, and D are called Collinear points.

Ψ **Non-Collinear Points:**

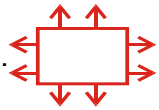
The points which do not lie on the same line are called Non-Collinear Points.



Note: Number of lines that can be draw through 'n' Non–Collinear points is $\frac{n(n-1)}{2}$

Ψ **Plane:** In mathematics, a smooth flat surface which extends endlessly in all the directions is called a "Plane"

Exmpale: 1. Surface of a black board in your class room.

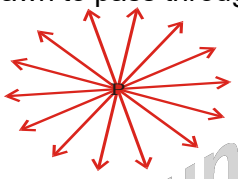


2. Floor of the class room etc

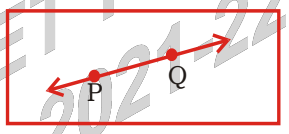
Note: 1. A plane has length and breadth

2. A plane has no thickness or boundary

3. An infinite number of lines can be drawn to pass through a given point in a plane

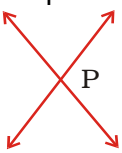


4. There is one and only one line that can be drawn to pass through two given points in a plane and this line lies wholly in the plane.



5 Two lines lying in a plane either intersect exactly at one point or are parallel

i) Parallel Lines



ii) Intersection Lines

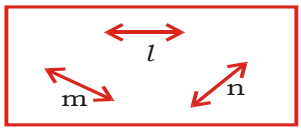
Ψ **Plane Figures:** The figures drawn in a plane with flat surfaces are called plane figures

Example: Triangle, Rectangle, Circle ....etc.,

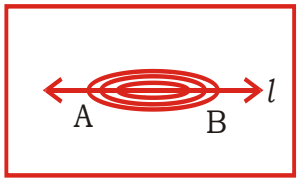
§§ **<u>Incidence Properties of in a Plane:</u>**

1) Points belonging to the same plane are called co–planar Points.

2) Lines belonging to the same plane are called as Co-Planar Lines



3) Only one line can be drawn through two different points in a plane. The line wholly lies in the plane containing the two points. But we can drawn infinite curved lines through two points in a plane .



4) Two different lines in a plane having a common point are called intersecting lines.Two intersecting lines in a plane have only one common point and the common point of intersecting lines is also called as point of intersection.

5) An unlimited number of lines can be drawn through a given point in a plane and they are called as concurrent lines and the point through which they pass is called as point of concurrence (or) Simply if three or more lines intersects at only one point , then such lines are called concurrent lines

Ψ **Space:**

The portion enclosed by an infinitly large ball is called space. It is a set of infinite points.

Note: 1. Two straight lines can not enclose a space

2. A space contains an infinite numbr of planes.

3. Points, lines and planes are subsets of space.

4. A space has infinte length, breadth and also thickness.

Ψ **Eulars Formula:**

If the number of vertices are V, the number of faces are F and the number of edges are E then the relation between them is given by V+F = E+2

TEACHING TASK

I. MCQ's with single correct answers

1. Number of line that can be drawn through "n" non collinear points is .....

A) $\frac{n(n+2)}{2}$ B) $\frac{n(n-1)}{2}$ C) $\frac{n-1}{2}$ D) $\frac{n+1}{2}$

2. If A,B,C are collinear then .....

A) AD+CD=AC B) AC+CB=AB C) BA-CA=BC D) AB+CD=AD

3. Two points in a plane determine.....

A) An infinte number of segments B) Exactly one segment

C) Two segments D) Three segments

4. Number of line segments that can be drawn through "n" non collinear points is...

A) $\frac{n(n-1)}{2}$ B) $\frac{n(n+1)}{2}$ C) $\frac{n}{2}$ D) Impossible

5. The number of line segments possible with three non collinear points is ....

A)1 B)2 C)3 D)Infinte

6. number of line segments possible with 5 non collinear points is .....

A)10 B)5 C)15 D)20

7. The minimum number of points of intersection of different lines in a plane is ....

A)4 B)3 C)5 D)1

8. The maximum number of points of intersection of "n" different lines in a plane is ....

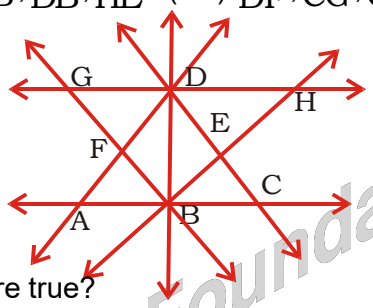
A) $\frac{n(n+1)}{2}$ B) $\frac{n(n-1)}{2}$ C) $\frac{n}{2}$ D) $\frac{n(n+3)}{2}$

9. If the number of vertices of a solid are 8, and number of faces are 6, then number of edges are .....

A)12 B)10 C)14 D)8

10. From the adjacent figure,the lines whose point of intersection B are given below.

(I) $\overleftrightarrow{AC}, \overleftrightarrow{AB}, \overleftrightarrow{BD}$ (II) $\overleftrightarrow{GB}, \overleftrightarrow{DB}, \overleftrightarrow{HE}$ (III) $\overleftrightarrow{DF}, \overleftrightarrow{CG}, \overleftrightarrow{CB}$ (IV) $\overleftrightarrow{HB}, \overleftrightarrow{GF}, \overleftrightarrow{CA}$



then which of the following are true?

A) only I & III B) only I,II, & III C) only I,III & IV D) only I,II & IV

MCQ's with more than one correct answers

◆ *This section contains multiple choice questions. Each question has 4 choices (A), (B), (C),(D),out of which* ***ONE or MORE*** *is correct. Choose the correct options*

11. A line _____

A) Has two end points

B) Has no end points

C) Extends in both the directions infinitely

D) Has only one end point

12. If P,Q,R are collinear points and Q lies between P & R , then which of the following is true ?

A) PR + RQ = PQ B) PQ + QR = PR

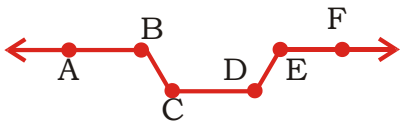
C) PR – RQ = PQ D) PQ – QR = PR

Assertion Reasoning Type:

◆ *This section contains certain number of questions. Each question contains Statement – 1(Assertion) and Statement – 2 (Reason). Each question has 4 choices (A), (B), (C) and (D) out of which* ***ONLY ONE*** *is correct Choose the correct option.*

A) Both Assertion and Reason are true. B) Both Assertion and Reason are false.

C)Assertion is true, Reason is false. D) Assertion is false, Reason is true.



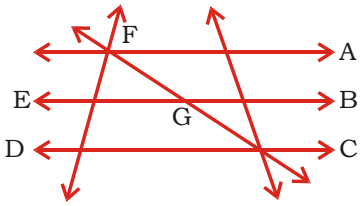
13. **Assertion** :From the above figure, the points A,B,C,D,E,F are collinear points

Reason :The points lying on the same line are collinear points.

III. Comprehension Type:

◆ *This section contains paragraph. Based upon each paragraph multiple choice questions have to be answered. Each question has 4 choices (A) , (B) ,(C) and (D) out of which **ONLY ONE i**s correct. Choose the correct option.*

In the adjacent figure,



14. The lines intersecting in C are _____

A) $\overleftrightarrow{CD}, \overleftrightarrow{EC}, \overleftrightarrow{AC}$ B) $\overleftrightarrow{CD}, \overleftrightarrow{AC}, \overleftrightarrow{GC}$ C) $\overleftrightarrow{CD}, \overleftrightarrow{AF}, \overleftrightarrow{BE}$ D) $\overleftrightarrow{CD}, \overleftrightarrow{AF}, \overleftrightarrow{BE}$

15. Collinear points are _____

A) A,B,C B)F,G,C C) E,G,B D) All of these

16. The lines passing through 'G' are _____

A) $\overleftrightarrow{FC}, \overleftrightarrow{EB}$ B) $\overleftrightarrow{FA}, \overleftrightarrow{AC}$ C) $\overleftrightarrow{FD}, \overleftrightarrow{CD}$ D) $\overleftrightarrow{AB}, \overleftrightarrow{AF}$

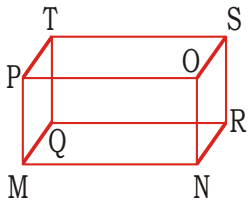
IV. Matrix Match Type:

◆ *This section contains Matrix-Match Type questions. Each question contains statements given in two columns which have to be matched. Statements (A, B, C, D) in **Column–I** have to be matched with statements (p, q, r, s) in **Column–II**. The answers to these questions have to be appropriately bubbled as illustrated in the following example.*

*If the correct matches are A-p,A-s,B-r,B-r,C-p,C-q and D-s,then the correct bubbled 4*4 matrix should be as follows:*

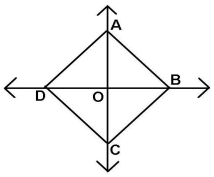
17. From the adjacent figure "Cuboid"

Column-I	**Column-II**
a) Number of its vertices	1) 12
b) Number of faces	2) 14
c) Number of edges	3) 8
d) Number of sides	4) 6
	5) Multiple of 2 and 3



Solve the following

1. Find the number of lines from the figure

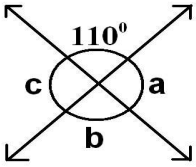


2. From the figure find the length of AC

3. Using Eulers formula find number of edges if no. of faces are 6 and vertices are 10

4. Using 5 non collinear points , how many lines can we draw?

5. From the figure ,find the values of a, b, c



LEARNER'S TASK

BEGINNERS (Level - I)

I. MCQ's with single correct answers

1. A point has a .....

A)No length B)breadth C)thickness D)height

2. Number of end points of a line is .....

A)0 B)1 C)2 D)5

3. A line contains .....Number of points

A)Finite B)Infinite C)0 D)2

4. Two different lines in a plane having a common point are called .....

A)Intersection B)Parallel C)coplanar D)concurrent

5. The common point of concurrent lines is called.....

A)point of Intersection B)point of concurrency
C)Intersection point D)concurrent point

6. In a solid , the number of vertices V, number of faces are F, and number of edges E,then the relation between them is .....

A)V+F=E+2 B)V+E=F+2 C)V+F=E-2 D)V+2=E+F

7. Three or more lines passing through the same point are called .....

A)Parallel lines B) coincident lines C)concurrent lines D)Non coplanar

8. Points , lines and planes are subsets of .....

A)Line B)Space C)Quadrilateral D)Circle

9. Three or more points in a plane are said to be collinear if they lie on the

A) Same Plane B) Same line C) Different Lines D) None

10. Three or more lines are said to be concurrent if they pass through the

A) Same Line B) Same Plane C) Same Point D) None

11. The lines belonging to the same plane are called____ Lines

A) Collinear B) Co-planar C) Both 1 and 2 D) None

12. The line AB is denoted by

A) $\overline{AB}$ B) $\overrightarrow{AB}$ C) $\overleftrightarrow{AB}$ D)AB

13. Which of the following is example for plane .....

A)Surface of the black board B)Edge of wall

C)Edge of a black board D)Edge of pencil

14. A ray AB is denoted by .....

A) $\overline{AB}$ B) $\overrightarrow{AB}$ C) $\overleftrightarrow{AB}$ D)AB

15. Points which donot lie on the same line are called.....points. .

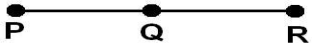
A)Collinear B)Non-intersecting

C)Non- coplanar D)Non-Collinear

ACHIEVERS (Level - II)

Solve the following

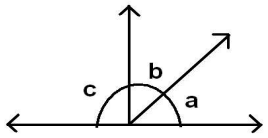
16. If PR = 10 cm and PQ = 3 cm then find QR ?



17. If $\angle A$ and $\angle B$ are Linear pair and $\angle B = 130^0$ then find $\angle A$

18. If $\angle A$ and $\angle B$ are supplementary angles and $\angle A = 90^0$ then find $\angle B$

19. From figure find numbe



EXPLORERS (Level - III)

I. MCQ's with more than one correct answers

◆ *This section contains multiple choice questions. Each question has 4 choices (A), (B), (C),(D),out of which* ***ONE or MORE*** *is correct. Choose the correct options*

20. If two lines are passing through one point , then they are called as.....

A)Collinear B)Parallel Lines

C)Intersecting lines D)Non parallel lines

21. Which of the following is / are plane figures .....

A) Triangle B) Cube C)Rectangle D) Circle

II. Assertion and Reasoning type questions:

◆ *This section contains certain number of questions. Each question contains Statement – 1 (Assertion) and Statement – 2 (Reason). Each question has 4 choices (A), (B), (C) and (D) out of which* ***ONLY ONE*** *is correct Choose the correct option.*

a) Both A and R are correct and R is correct explanation of A.

b) Both A and R are correct and R is not correct explanation of A.

c) A is correct and R is incorrect. d) A is incorrect and R is correct.

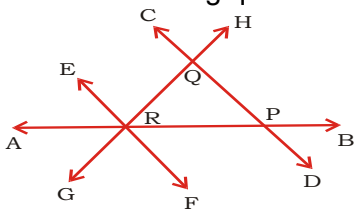
22. ***A:*** Number of lines that can be drawn through "10" non collinear points is 45

R :Number of lines that can be drawn through "n" non collinear points is $\frac{n(n-1)}{2}$

III. Comprehension :

♦ *This section contains paragraph. Based upon each paragraph multiple choice questions have to be answered. Each question has 4 choices (A) , (B) ,(C) and (D) out of which* ***ONLY ONE*** *is correct. Choose the correct option.*

Using the following figure, answer the following questions:



23. One pair of non intersecting lines is

A) $\overleftrightarrow{AB},\overleftrightarrow{GH}$ B) $\overleftrightarrow{EF},\overleftrightarrow{GH}$ C) $\overleftrightarrow{EF},\overleftrightarrow{DC}$ D) both A & B

24. Three concurrent lines are

A) $\overleftrightarrow{AB},\overleftrightarrow{GH},\overleftrightarrow{EF}$ B) $\overleftrightarrow{AB},\overleftrightarrow{GH},\overleftrightarrow{CD}$ C) $\overleftrightarrow{EF},\overleftrightarrow{CD},\overleftrightarrow{AB}$ D) both B&C

25. The lines whose point of intersection 'R' are

A) $\overleftrightarrow{AB},\overleftrightarrow{CD}$ B) $\angle PQR$ C) $\overleftrightarrow{AB},\overleftrightarrow{FE}$ D) all of these

KEY

ΦΦ TEACHING TASK :

1)B 2) C 3) B 4) A 5)C 6) A 7)D 8) B 9) A 10) D

11) B,C 12) B , C, 13) D , 14) D 15) C 16) A 17) 3, 4, 1, 1

ΦΦ LEARNER'STASK :

☐ **BEGINNERS :**1)A , 2) A , 3) B 4) A , 5) B, 6) A 7) C 8) B 9) B 10)C

11) B 12) C 13)A 14) B 15) D,

☐ **EXPLORERS :**20) C, D 21) A,C,D, 22) A 23) C 24) A 25) C

§§ LINE SEGMENT

Ψ **LINE SEGMENT:** A part of a line with two end points is called a line segment. A line segment whose end points are A and B is denoted by $\overline{AB}$ or $\overline{BA}$.

i. e it has only length but no direction.

A line segment is also a set of infinite points and all the points are in between the end points of the line .

Ψ **Number of line Segments:** If A, B, C, D, E ... are on a line segment $\overline{PQ}$, then the number of line segments determained by the 'n' points lying on $\overline{PQ}$ is $\frac{n(n-1)}{2}$.

Ψ **Length of a line Segment:** The length or measure of a line segment AB is denoted by $\overline{AB}$ and it is a positive number showing the distance between A and B.

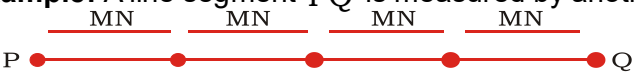
Ψ **ComparisIon of line Segments:** Two or more line segments can be compared by the virtue of their length. The instruments like ruler, divider, compass can be used to compare, the line segments.

Ψ **Congruent line Segments:** If the lengths of two line segments is same, then they are called as 'congruent segments'.

i.e. if length of $\overline{AB}$ = length of $\overline{CD}$, then it is denoted by $\overline{AB} \cong \overline{CD}$ where "$\cong$" is the symbol of congruency and read as $\overline{AB}$ is congruent to $\overline{CD}$

Ψ **Measurement of a line Segment :** A line segment can be measured by comparing it with a standard segment called a unit segment. The number of times a unit segment is contained in a given segment is called its measure or length.

Example: A line segment $\overline{PQ}$ is measured by another line segment $\overline{MN}$ of unit measured i.e



$\Rightarrow \overline{PQ} = 4\,\overline{MN} = 4$ units.

The basic unit of length in the international system of units (SI) is meter. The other units of length are derived from it as the following :

Unit	Symbol	Relation with meter
Millimeter	mm	$1\text{ mm} = \frac{1}{1000}$ mts
Centimeter	cm	$1\text{ cm} = \frac{1}{100}$ mts
Decimeter	dm	$1\text{ dm} = \frac{1}{10}$ mts
Decameter	dem	1 dem = 10mts
Hectameter	hm	1 hm = 100mts
Kilometer	km	1 km = 1000mts

From the above relation it is noted that

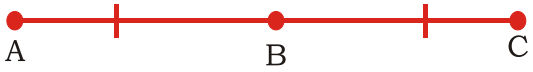
1 cm = 10 mm

1 dm = 10 cm

The instruments like ruler, divider, etc can be used to determine the length of line segments.

The greater lengths like length of claas room, badminton court... etc can be measured by a tape

Ψ **Betweenness:** If A, B and C are any three collinear points and if AB + BC = AC, then we say that B is between A and C. Also if $\overline{AB} = \overline{BC}$ then B is called mid point of $\overline{AC}$. Here B is said to be bisector of $\overline{AC}$



TEACHING TASK

I. MCQ's with single correct answers

1. If A,B,C are collinear and also AB = BC then B is .....

A)Point between A and C B)Mid Point of AC

C) Bisector of AC D) All the above

2. if AB=6cm,CD=4cm then AB+2CD is.....

A)2cm B)10cm C)24 cm D)14 cm

3. If B is mid point of AC then AB = ...

A) AC B) BC C) 2AB D) 2CB

4. If AB = 6 cm, CD = 3cm the relation between AB and CD is .....

A) $AB = CD$ B) $AB > CD$ C) $AB < CD$ D) 2AB = CD

5. If AC = 8 cm,and B is the mid point of AC then which of the following is true

A) AB = 4 cm B) BC = 5 cm C) AB = 8 cm D) BC= 8 cm

6. AB = 10 cm then $\frac{AB}{2}$ = ...

A) 5 cm B)20 cm C) 100 cm D) 25 cm

7. One hectameter is equal to 100 times x meters then x = ...

A) 1 B) 10 C) 100 D) 1000

8. Line segment AB is congruent to line segment CD is written as .....

A) $AB = CD$ B) $AB \neq CD$ C) $AB \cong CD$ D) None

9. If AB = 6 cm and CD = 4.5 cm then 4 CD - 2 AB = ...

A) 0 cm B) 2 cm C) 4 cm D) 6 cm

10 . If AB + BC = AC and A,B,C are collinear then .....

A) B lies between A & C B) A lies between B & C

C) C lies between A & B D) None

11. 

denotes _____line segments.

A) 5 B) 12 C) 15 D) 10

12. Which of the following is symbol for congruency

A) = B) ~ C) ≅ D) None

13. If $\frac{2}{3}AB = \frac{7}{2}BC = 42$ cm then .....

A) AB = BC B) AB < BC C) AB > BC D) $AB \leq BC$

14. If the line segment AB = 4.6 cm and CD = 3.8 cm , then the measure of the line segment whose length is equal to the difference of AB and CD is .....

A) 1.8 cm B) 2.8 cm C) 0.8 cm D) 8.4 cm

15. The number of linesegments determined by 5 points on PQ .....

A) 10 B) 5 C) 15 D) 20

16. If A,B,C are collinear and AB : BC = 3:4 , BC = 24 cm then AB , AC are ....

A) 20 cm , 42 cm B) 18 cm , 30 cm C) 42 cm , 18 cm D)18m, 42cm

Level - II

I. MCQ's with more than one correct answers

♦ *This section contains multiple choice questions. Each question has 4 choices (A), (B), (C),(D), out of which* ***ONE or MORE*** *is correct. Choose the correct options*

17. In the following line segments, which of the following is false ?

A) AB > CD B) AB = CD C) AB < CD D) AB $\geq$ CD

18. If AE = 47.6 cm, CD = 12.9 cm, AB = 8.903 cm , AC = 16.57 cm and DE =10.896 cm, then the total length AC + CE + BC is_____cm.

A) 8629.7/100 B) 862.97 C) 86297/1000 D) 86.297

19. If AB = 6.5 cm & CD = 3.5 cm, then 2AB – 3CD = _____

A) 4.5 cm B) 0.45 cm C) 2.5 cm D) $\frac{5}{2}$ cm

II. Assertion Reasoning Type:

♦ *This section contains certain number of questions. Each question contains Statement – 1(Assertion) and Statement – 2 (Reason). Each question has 4 choices (A), (B), (C) and (D) out of which* ***ONLY ONE*** *is correct Choose the correct option.*

A) Both Assertion and Reason are true.

B) Both Assertion and Reason are false.

C) Assertion is true, Reason is false.

D) Assertion is false, Reason is true.

20. **Assertion** *:* If two line segments $\overleftrightarrow{AB}$ and $\overleftrightarrow{CD}$ are of equal length , then they are said to be congruent and it is denoted by $\overleftrightarrow{AB} \cong \overleftrightarrow{CD}$.

Reason*:* If AB+BC=AC and AB=CB, then B is said to be the mid point of AC

III. Comprehension Type:

♦ *This section contains paragraph. Based upon each paragraph multiple choice questions have to be answered. Each question has 4 choices (A) , (B) ,(C) and (D) out of which* ***ONLY ONE i****s correct. Choose the correct option.*

If AB = 10 cm and CD = 6.2 cm , then

21. AB + 2CD = _____

A) 22.1 cm B) 22.2 cm C) 22.3 cmD) 22.4 cm22.

22. AB – CD = _____

A) 3.8 cm B) 3.6 cm C) 3.9 cm D) 3.7 cm

23. $\frac{CD}{2}$ = _____

A) 2 cm B) 3.1 cm C) 3.2 cm D) 3.3 cm

IV. Matrix Match Type:

♦ *This section contains Matrix-Match Type questions. Each question contains statements given in two columns which have to be matched. Statements (A, B, C, D) in **Column–I** have to be matched with statements (p, q, r, s) in **Column–II**. The answers to these questions have to be appropriately bubbled as illustrated in the following example.*

*If the correct matches are A-p,A-s,B-r,B-r,C-p,C-q and D-s,then the correct bubbled 4*4 matrix should be as follows:*

24.

Column-I		**Column-II**
a) 1 mm = ____ mts	[ ]	1) 10^4
b) 1 dm = _____ mts	[ ]	2) 10
c) 1 dem = _____ mts	[ ]	3) 1/10
d) 1 km = _____ mts	[ ]	4) 1/1000
		5) 1000

Solve the following

1. If $\frac{5}{2}AB = 35\,cm$ then find value of AB

2. Find the value of 2 BC - CD ,If BC = 4.9 cm and CD = 4 cm

3. Convert 2 Km into decametre

4. Convert 35 cm into Metres

LEARNER'S TASK

BEGINNERS (Level - I)

I. MCQ's with single correct answers

1. A part of line with two end points is called a .....

A) Line B) Line segment C) Ray D) Plane

2. A Line segment whose end points A and B is denoted by .....

A) $\overline{AB}$ B) $\overrightarrow{AB}$ C) $A\,ll\,B$ D) $\overrightarrow{BA}$

3. 1 m = ... m.m

A) 10 B) 100 C) 1000 D) 10,000

4. 1 km = ...m

A) 1000 B) 10 C) 100 D) 10,000

5. Two line segments having same length are said to be .....

A) Congruent segments B) Unequal segments

C) Non congruent segments D) None

6. The number of end points of a line segment are .....

A) 3 B) 4 C) 2 D) 1

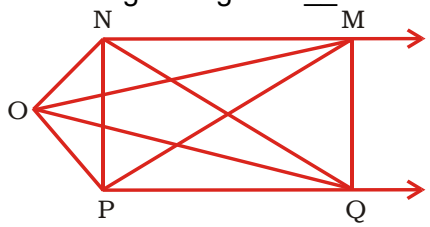
7. The number of end points of a line are .....

A) 3 B) 2 C) 1 D) 0

8. The instrument used to compare two line segments is_____

A) Compass B) Divider C) Set square D) Protractor

9. The number of line segments in the given figure is__



A) 8 B) 9 C) 10 D) 12

10. If AD = (5x + 20) cm, AB = (x + 10) cm , CD = (2x + 5) cm = 13 cm, then AB + CD + DA =

A) 67 cm B) 42 cm C) 57 cm D) 63 cm

ACHIEVERS (Level - II)

Solve the following

11. If AB = 6 cm and CD = 4.5 cm then find 3 AB - CD

12. Find the length of $\frac{BC}{2}$, I f BC = 20 cm

13. Find AC, if B is the midpoint of A and C and AB = 3 cm

EXPLORERS (Level - III)

I. MCQ's with more than one correct answers

*This section contains multiple choice questions. Each question has 4 choices (A), (B), (C),(D),out of which **ONE or MORE** is correct. Choose the correct options*

14. AB = 5 cm and CD = 3 cm then 5 AB - 3 CD =.....

A) 16 cm B) 4^2 cm C) 4 X 4 cm D) 4+4 cm

15. If AB = x + 10 = 5 cm , BC = X + 5 cm then AB + BC = ...

A) 5cm B) 25 cm C) $\sqrt{25}$ cm D) 10 cm

II. Assertion and Reasoning type questions:

*This section contains certain number of questions. Each question contains Statement – 1 (Assertion) and Statement – 2 (Reason). Each question has 4 choices (A), (B), (C) and (D) out of which **ONLY ONE** is correct Choose the correct option.*

a) Both A and R are correct and R is correct explanation of A.

b) Both A and R are correct and R is not correct explanation of A.

c) A is correct and R is incorrect. d) A is incorrect and R is correct.

16. ***A:*** Number of linesegment that can be drawn through "4" non collinear points is 16

R :Number of line that can be drawn through "n" non collinear points is $\frac{n(n-1)}{2}$

III. Comprehension Type:

- *This section contains paragraph. Based upon each paragraph multiple choice questions have to be answered. Each question has 4 choices (A) , (B) ,(C) and (D) out of which **ONLY ONE i**s correct. Choose the correct option.*

If $\frac{4}{7}$ AB = 19.6 cm & BC + 12.4 cm = 37.9 cm, CD – 4.6 cm = 30.1 cm & DE $\div$ 8 = 2.7 cm, then

17. AB + BC > _____

A) DE + BC B) AB + CD C) CD + BC D) none

18. AB + BC+CD–x =DE, then x= _____

A) 72.9cm B) 63.9cm C) 64.9 cm D) 62.9 cm

19. The descending order of the lengths of line segments is _____

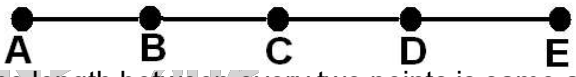
A) DE,AB,BC,CD B) CD,DE,AB,BC

C) CD, AB,BC,DE D) CD,BC,AB,DE

IV. Match the following

- *This section contains Matrix-Match Type questions. Each question contains statements given in two columns which have to be matched. Statements (A, B, C, D) in **Column–I** have to be matched with statements (p, q, r, s) in **Column–II**. The answers to these questions have to be appropriately bubbled as illustrated in the following example.*

*If the correct matches are A-p,A-s,B-r,B-r,C-p,C-q and D-s,then the correct bubbled 4*4 matrix should be as follows:*



From the given figure the length between every two points is same and $\overline{AE} = 4\ cm$

20.

Cloumn - I	**Cloumn - II**
i) $\overline{AC}$ = ____	a) 3 cm
ii) $\overline{AD}$ = ____	b) 2 cm
iii) $\overline{AE}$ = ____	c) 4 cm
iv) $\overline{CD} + \overline{AD}$ = ____	d) 1 cm
	e) 5 cm

KEY

ΦΦ TEACHING TASK :

1)B 2) D 3) B 4) B 5)A 6) A 7)A 8) C 9) D 10) A

11)D 12) C 13) C 14) C 15)A 16) D 17)A,C,D 18) D 19)C,D 20) A

21)D 22) A 23)B 24) 4,3,2,5

ΦΦ LEARNER'STASK :

- **BEGINNERS :**1)B 2) A 3) C 4) A 5) A 6)C 7) D 8) B 9) C 10)A
- **EXPLORERS :**14) A,B,C 15) A,C 16) D 17) A 18) A 19) C 20) B,A,C,C

§§ LINES AND ANGLES

Ψ Angle:

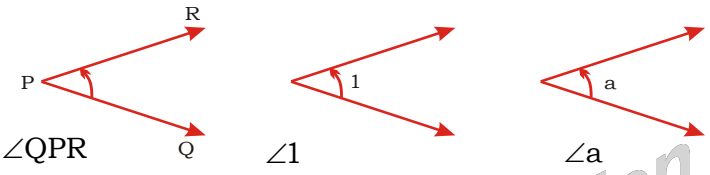
An angle is the union of two different rays having the same initial point. (or)

Amount of rotation

Ψ Representing an angle:

Generally we use three capital letters to represent an angle. The above angle is represented by $\angle AOB\ (or)\ \angle BOA$ and is read as 'angle AOB' or 'angle BOA'. Note that the middle letter denotes the vertex of the angle. The symbol $\angle$ stands for angle. It can also be represented by $\angle O$. Some times we use numbers or lower case letter to denote angles.

Ψ Consider the following angles:



$\angle P = \angle RPQ = \angle QPR$ $\angle 1$ $\angle a$

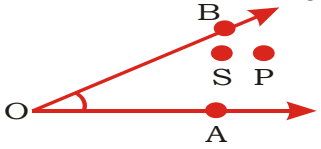
§§ INTERIOR AND EXTERIOR OF AN ANGLE:

An angle divides the plane into three regions.

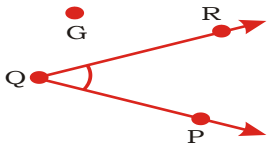
i) Point belongs to the angle:

If any point (like P) lying on one of its arms, then that 'P' belongs to the angle.

ii) Interior of an angle: In the following figure, 'S' does not belong to the angle. Note that the points 'S' and 'P' are on the same side of the $\overrightarrow{OB}$ and the points 'S' and 'P' are also on the same side of the $\overrightarrow{OA}$. Such a point is said to be in the interior of the angle.



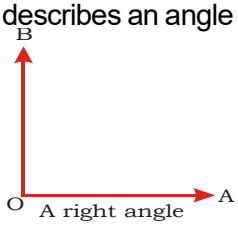
iii) Exterior of an angle: In the following figure, 'G' does not belong to the angle. It is not in the interior of the angle. We say that it is in the exterior of the angle.



Ψ Magnitude of an angle: The magnitude of an angle is the amount of rotation through which one of the arms must be rotated about the vertex to bring it to the position of the other.

Ψ Measure of an angle: To find out the magnitude to a given angle, we need a standard unit angle. Then we can compare the given angle with the unit angle and say its measure.

i) A quarter turn of a ray $\overrightarrow{OA}$ about O describes an angle which is called a right angle.



ii) Units for measuring angle:

A right angle is divided into 90 equal parts and each part is called a degree. Degree is the unit for measuring an angle.

One degree is written as 1°. One degree is divided into 60 equal parts and each part is called a minute. One minute is divided into 60 equal parts and each part is called a second. 1 minute is denoted by 1^1. 1 second is denoted by 1^{11}.

$1^0 = 60^1$ (read as 60 minutes)

$1^1 = 60^{11}$ (read as 60 seconds).

§§ TYPES OF ANGLES:

Ψ **Acute angles:** An angle whose measure is less than 90° and greater than O° is called an acute angle i.e., If θ is an acute angle, then $0^\circ < \theta < 90^\circ$

Ψ **Right angle:** An angle whose measure is 90° is called a right angle.

Ψ **Obtuse angle:** An angle whose measure is greater than 90° and less than 180° is called obtuse angle.

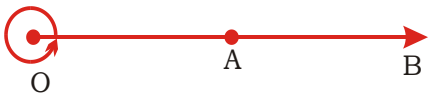
Ψ **Straight angle:** An angle whose measure is 180° is called a straight angle.

Note: A straight angle = Two right angles.

Ψ **Reflex angle:** An angle whose measure is greater than 180° and less than 360° is called a reflex angle.

Ψ **Complete angle:** An angle whose measure is 360° is called a complete angle

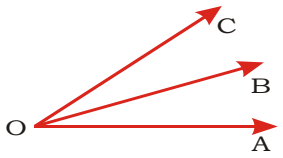
Here $\angle AOB$ is 360°.



Note: A complete angle = Four right angles.

Ψ **Zero angle:** If the measure of the angle is zero, it is called a zero angle.

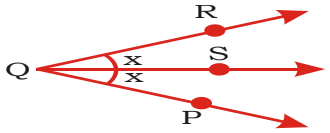
§§ OPERATIONS WITH ANGLES:



Consider $\angle AOB$ and $\angle BOC$ in the above figure. Both $\angle AOB$ and $\angle BOC$ have a common arm $\overrightarrow{OB}$ and a common vertex 'O'. $\therefore \angle AOC = \angle AOB + \angle BOC$.

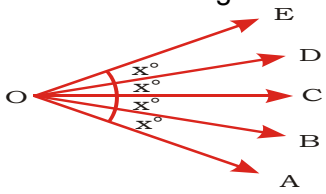
Ψ Bisector of the angle:

i)



$\angle PQS$ and $\angle SQR$ have the same measure and congruent. So $\overrightarrow{QS}$ is called the bisector of $\angle PQR$. A ray which divides an angle into two congruent angles is called the bisector of the angle.

ii)



In the above figure, $\angle AOE$ is divided into four congruent angles.

$\angle AOB = \angle BOC = \angle COD = \angle DOE = x^o, \angle AOE = 4x^o$

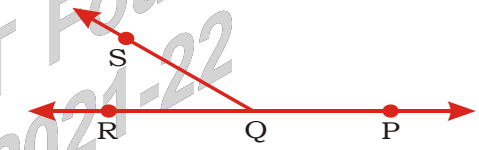
$\angle AOB = \frac{\angle AOE}{4}, \angle AOC = \frac{\angle AOE}{2}, \angle AOD = \frac{3\angle AOE}{4}$

§§ PAIRS OF ANGLES:

i) Adjacent angles:

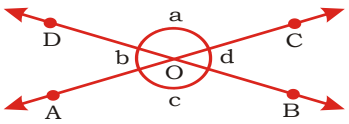
Two angles in a plane are called adjacent angles, if they have a common vertex, a common side and their interiors do not have a common point.

ii) Linear pair



In the above figure $\angle PQS$ and $\angle RQS$ are adjacent angles, $\overrightarrow{QP}$ and $\overrightarrow{QR}$ are opposite rays. Such a pair of adjacent angles is called a 'linear pair' (or) the pair of adjacent angles whose non common arms are opposite rays is called a 'linear pair'. Linear pair forms 180°.

iii) Vertically opposite angles: Consider two lines $\overleftrightarrow{AC}$ and $\overleftrightarrow{BD}$ intersecting at 'O'.



Consider the $\angle a$ and $\angle c$. They have a common vertex "O' but do not have common arm. Such angles are called vertically opposite angles. $\angle b$ and $\angle d$ are also vertical opposite angles, which are equal.

iv) Supplementary angles:

Two angles are said to be supplementary if the sum of their measure is 180°.

Ex: The measure of the supplementary angle of 20^0 is $180^0 - 20^0 = 160^0$

Ψ Complementary angles:

If the sum of the measures of two angles is equal to 90°, then they are called Complementary angles.

Ex: The measure of the complementary angle of 60^0 is $90^0 - 60^0 = 30^0$

TEACHING TASK

I. MCQ's with single correct answers

1. If angle is equal to its complement then the angle is .....

A) 45^0 B)60^0 C) 75^0 D) 30^0

2. If a+25 = b+ 65 = 90^0 then a, b are.....

A)65^0, 25^0 B) 25^0, 65^0 C) 30^0, 60^0 D) 45^0,45^0

3. The pair of adjacent angles whose non common arms are opposite rays is called__

A) Complementary B) Not possible C)Linear pair D) pair

4. If ratio of two complementary angles is 7:8, then the angles are .....

A) 48^0, 52^0 B) 42^0, 58^0 C) 42^0, 48^0 D) 48^0, 32^0

5. If $\angle ABC + 68^0 = 156^0$ Then $\angle ABC$ =.....

A) an acute angle B) An obtuse angle C) A reflex angle D) None

6. If the ratio of two supplementary angles 4:5 then the angles are .....

A) 108^0, 62^0 B) 102^0, 78^0 C)80^0, 100^0 D)95^0, 85^0

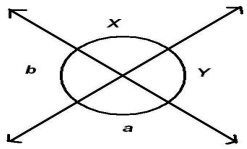
7. If x^0 , $x + 20^0$ complementary angles then the angles are .....

A) 45^0,45^0 B) 65^0,25^0 C) 35^0,45^0 D) 35^0,55^0

8. Two adjacent angles on a straight line arex^0 and $(2x - 21)^0$ then x = ...

A) 57^0 B) 67^0 C) 77^0 D) 87^0

9. In the figure X : Y = 4 : 11, then a, b are .....



A) 48^0, 112^0 B) 132^0, 60^0 C)48^0 , 132^0 D) 45^0, 135^0

10. $x = \frac{y}{4} = \frac{z}{3} = 35^0$ then x + y + z = ...

A) 135^0 B)200^0 C) 240^0 D)280^0

MCQ's with more than one correct answers

- *This section contains multiple choice questions. Each question has 4 choices (A), (B), (C),(D), out of which* ***ONE or MORE*** *is correct. Choose the correct options*

11. A complete rotation of a ray OA about O makes an angle of .....

A) Two straight Angles B) Four right angles C) 180^0 D) 90^0

12. If $6\angle ABC = 360^o$, $4\angle PQR = 360^0$, then

A) $\angle B = 60^0, \angle Q = 100^0$ B) $\angle B = 60^0, \angle Q = 90^0$

C) $\angle B + \angle Q = 30^0$ D) $\angle B$, is complement of 30^0 & $\angle Q$ is supplement of 90^0

Assertion Reasoning Type:

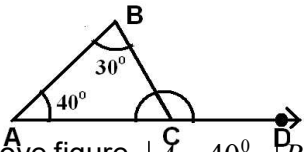
⬧ *This section contains certain number of questions. Each question contains Statement – 1 (Assertion) and Statement – 2 (Reason). Each question has 4 choices (A), (B), (C) and (D) out of which **ONLY ONE** is correct Choose the correct option.*

A) Both Assertion and Reason are true. B) Both Assertion and Reason are false.
C) Assertion is true, Reason is false. D) Assertion is false, Reason is true.

13. **A:** If an angle is 30^0 less then two times its supplement , then the angles are 70^0,110^0
R: If sum of two angles is 180^0 , then they are known as complementary angles

Comprehension

⬧ *This section contains paragraph. Based upon each paragraph multiple choice questions have to be answered. Each question has 4 choices (A) , (B) ,(C) and (D) out of which **ONLY ONE i**s correct. Choose the correct option.*



From the above figure $\angle A = 40^0$, $\angle B = 30^0$

14. $\angle BCA =$ _____

A) 100^0 B) 120^0 C) 150^0 D) 110^0

15. $\angle BCD =$ _____

A) 60^0 B) 20^0 C) 70^0 D) 10^0

16. $\angle BCA + \angle BCD =$ _____

A) 100^0 B)120^0 C) 150^0 D) 180^0

IV. Matrix Match Type:

⬧ *This section contains Matrix-Match Type questions. Each question contains statements given in two columns which have to be matched. Statements (A, B, C, D) in **Column–I** have to be matched with statements (p, q, r, s) in **Column–II**. The answers to these questions have to be appropriately bubbled as illustrated in the following example.*

*If the correct matches are A-p,A-s,B-r,B-r,C-p,C-q and D-s,then the correct bubbled 4*4 matrix should be as follows:*

17.

Column-I	**Column-II**
a) Acute angle is	1) 91^0
b) Obtuse angle is	2)181^0
c) Reflex angle is	3) 90^0
d) Right angle is	4) 89^0
	5) 70^0

Solve the following

1. If $(3\angle X + 40)^0$ and $(\angle X - 20)^0$ are Supplementary ,find the value of $\angle X$

2. If $\frac{5}{4}\angle A = 135^0$ then find $\frac{1}{2}\angle A$

3. Find the complemetary angles of the following (i) 69^0 (ii) 71^0 (iii)54^0

LEARNER'S TASK

BEGINNERS (Level - I)

I. MCQ's with single correct answers

1. The symbol of an angle is .....

A) = B) ~ C) $\cong$ D) <

2. The Unit of measure of an angle is .....

A) cm B) km C) Degree D) Grams

3. The terminal ray and initial ray becomes opposite then the angle is.....

A) Right Angle B) Straight angle

C) Reflex angle D)Complete angle

4. The measure of angle is Greater than 0^0 and lessthan 90^0 then the angle is .....

A) Acute B) Straight angle C) Reflex D) Obtuse

5. The measure of an angle is Greater than 90^0 and lessthan 180^0 then the angle is .....

A) Acute B) Obtuse C) Straight angle D) Reflex

6. The instrument used to measure the angle is .....

A)Compass B) Divider C) Set square D) Protractor

7. The sum of measure of any two angle is 180^0 then they are said to be .....

A) Complementary angle B) Supplementary angle

C) Straight angle D)Right angle

8. The Sum of measure of any two angles is 90^0 then they are said to be ....

A) Complementary angle B) Supplementary angle

C) Straight angle D) Right angle

9. If the terminal ray coincident with initial ray after one rotation then the angle formed is

A) Straight angle B) Complement angle C) Right angle D) None

10. If the measure of an angle is 304^0 then it is called ...

A) Acute Angle B) Obtuse angle

C) Straight angle D)Reflex angle

11. The complement angle of 41^0 is .....

A) 73^0 B)35^0 C) 49^0 D) 62^0

12. The suplement angle of 72^0 is .....

A) 108^0 B) 89^0 C) 18^0 D) 9^0

13. The complement angle of 2^0 is .....

A)178^0 B) 88^0 C) 58^0 D) 78^0

14. The suplement angle of 178^0 is .....

A)1^0 B) 2^0 C) 3^0 D) 4^0

15. Which of the following pair is complement angles?
A) 23^0, 67^0 B)53^0, 67^0 C) 63^0, 37^0 D) 43^0, 67^0

16. Which of the following pair is supplement angles?
A) 108^0, 52^0 B) 108^0, 82^0C) 102^0, 58^0 D) 108^0, 72^0

17. Which of the following is reflex angle?
A) 181^0 B)279^0 C) Both 1 and 2 D)179^0

18. Each angle in a pair of complementry angles is ....
A) Obtuse B) Reflex C) complete D) Acute

19. If $\frac{4}{5}\angle A = 72^0$, then $\frac{2}{3}\angle A + 132^0$ is less than 360^0 by _____degrees
A) 164^0 B)165^0 C) 167^0 D) 168^0

20. If two complementary angles are differ by 10^0, then the angles are
A) 30^0, 60^0 B) 70^0,20^0 C) 50^0,40^0 D) 45^0, 55^0

21. If $(3\underline{|x}+40)^0$, $(\underline{|x}-20)^0$ are supplementary, then the value of 'x' is___
A) 50^0 B) 60^0 C) 40^0 D) 20^0

ACHIEVERS (Level - II)

Solve the following

1. If $x=\frac{y}{3}=\frac{z}{4}=25$ then find the value of x + y + z

2. If x + 10 and x + 40 are complentary angles then find the value of angles

3. Find the Supplementary angles of the following (i) 135^0 (ii) 120^0 (iii) 170^0

4. Convert 3^0 into minutes

EXPLORERS (Level - III)

I. MCQ's with more than one correct answers

◆ *This section contains multiple choice questions. Each question has 4 choices (A), (B), (C),(D) out of which **ONE or MORE** is correct. Choose the correct options*

22. If supplement of 123^0 is added to complement of 52^0, then their sum is
A)>90^0 B)<180^0 C) <360^0 D) <30^0

23. If $\angle BAD = (5x-30)^0$ $\angle CAD = 2x^0$, AB and AC are opposite rays the value of x^0 is
A) 2 X 15º B) 40º C) 30º D) 50º

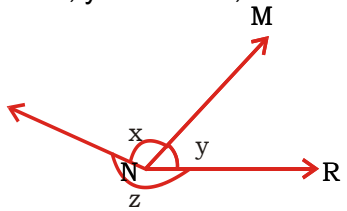
24. In the linear pair, the sum of angles is .....
A) 2 of 90^0 B) 45^0 C) 180^0 D) 270^0

II. Assertion Reasoning Type:

◆ *This section contains certain number of questions. Each question contains Statement – 1 (Assertion) and Statement – 2 (Reason). Each question has 4 choices (A), (B), (C) and (D) out of which **ONLY ONE** is correct Choose the correct option.*

A) Both Assertion and Reason are true. B) Both Assertion and Reason are false.
C) Assertion is true, Reason is false. D) Assertion is false, Reason is true.

25. ***A:*** If x +20^0=70^0, y+30^0=180^0, z –25=135^0, then $(\angle x+\angle y+\angle z)^0$ is complete angle



R: Four consecutive right angles form a complete angle

III. Comprehension Type:

- *This section contains paragraph. Based upon each paragraph multiple choice questions have to be answered. Each question has 4 choices (A) , (B) ,(C) and (D) out of which **ONLY ONE i**s correct. Choose the correct option.*

If $a = 137^0$, $b=59^0$, $c=37^0$, $d = 68^0$, then

26. If $(a–b)^0$ is simplified the resultent answer is

A) an obtuse angle B) An acute angle C) A reflex angle D) A or C

27. If $(b+c)^0$ is simplified the resultent answer is

A) an obtuse angle B) An acute angle C) a reflex angle D) B or C

28. If $(a^0+d^0–25^0)$ is simplified the answer is

A) Complete angle B) Straight angle

C) Right angle D)Reflex angle

IV. Match the following

- *This section contains Matrix-Match Type questions. Each question contains statements given in two columns which have to be matched. Statements (A, B, C, D) in **Column–I** have to be matched with statements (p, q, r, s) in **Column–II**. The answers to these questions have to be appropriately bubbled as illustrated in the following example.*

*If the correct matches are A-p,A-s,B-r,B-r,C-p,C-q and D-s,then the correct bubbled 4*4 matrix should be as follows:*

29.

Column -I		Column - II
1) $90 - x^0$	[ ]	a) Complete angle
2) 180^0	[ ]	b) Supplement of x
3) 360^0	[ ]	c) Complement angle
4) $180 - x^0$	[ ]	d) Straight angle
		e) Reflex angle

KEY

ΦΦ TEACHING TASK :

1)A 2) A 3) C 4) C 5)A 6) C 7)D 8) B 9) C 10)D 11)A,B

12)B,D 13) C 14-D, 15-C, 16-D 17) 4 ,5,1,2,3;

ΦΦ LEARNER'STASK :

☐ **BEGINNERS :**

1)D 2) C 3) B 4) A 5) B 6)D 7) B 8) A 9) D 10)D

11)C 12)A 13)B 14)B 15)A 16)D 17)C 18) D 19)D 20)C 21)C

☐ **EXPLORERS :** 22) A,B,C 23)A, C 24) A, C 25)A 26) B 27)A 28)B 29) C,D,A,B

§§ Parallel Lines and Transversal

Ψ Parallel lines:

Two lines '*l*' and 'm' are said to be parallel, if they lie in the same plane and do not have a common point.

If '*l*' and 'm' are parallel, then we can represent them as *l*//m.

Ψ Perpendicularity:

If the measure of an angle between two lines is 90°, then the two lines are said to be perpendicular to each other.

The relation 'is perpendicular to' is denoted by the symbol '$\perp$'. $\overleftrightarrow{AB} \perp \overleftrightarrow{CD}$ is read as the line AB is perpendicular to the line CD.

Ψ Collinear points:

Points are said to be collinear, if they lie on the same line.

If the points lie on the same line then they are collinear.

A, B, C are collinear points

Ψ Non collinear points:

The points not lying on the same line are called non collinear points

P, Q, R are non collinear points

Note: A, B and C are collinear and B is between A, C if and only if AB + BC = AC.

If there are two points in a plane, always we can draw a line passing through them.

If there are three points in a plane, we may or may not be able to draw a line passing through them. If we draw a line, those points are called collinear. If we can not draw a line, those points are called non collinear.

Ψ Coplanar points:

Points are coplanar if and only if they lie in the same plane.The points which are not on the same plane are called non coplanar points.A plane can be determined by three non - collinear points.

Ψ Coplanar lines: The lines on the same plane are called coplanar lines.

Example: Lines drawn on a paper.

Ψ Non coplanar lines:

The lines which are not in the same plane are called non coplanar lines.

Ψ Intersecting lines:

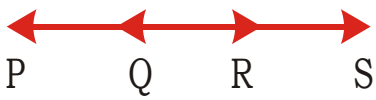
If two lines are having a common point. Then they are said to be intersecting lines.

Ψ Concurrent lines:

If three or more lines are having the same common point, then those lines are called concurrent lines.

Ψ Coincident lines: Two lines having infinite common points are called coincident lines.

Example:



$\overleftrightarrow{PR}, \overleftrightarrow{QS}$ are called coincident lines.

Ψ **Angle between parallel lines:**

For any two lines having a common point, we can find the angle between them. But parallel lines never intersect, so we can consider the angle between them as 0°.

Ψ **Distance between parallel lines:**

Any two parallel lines never intersect and the distance between them is same any where. Therefore the distance between the parallel lines is a constant.

Ψ **Transversal:**

A straight line which intersect two (or) more given lines at different points is called a transversal

§§ **CLASSIFICATION OF ANGLES FORMED BY A TRANSVERSAL:**

Ψ **Alternate angles:** Two angles are said to be a pair of Alternate angles if

a) They are on either side of the transversal.

b) Both are interior angles or exterior angles.

c) They are not adjacent angles.

Note: If alternate angles are equal, then the lines are parallel.

Ψ **Alternate interior angles:**

The pair of alternate angles inside the two parallel lines are called alternate interior angles.

Ψ **Alternate exterior angles:**

The pair of alternate angles exterior to the two parallel lines are called Alternate exterior angles.

Ψ **Pairs of alternate interior angles:** $(\angle 3, \angle 6)$ and $(\angle 4, \angle 5)$

Ψ **Pairs of alternate exterior angles:** $(\angle 1, \angle 8)$ and $(\angle 2, \angle 7)$

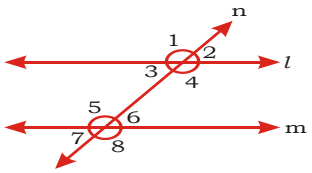
Ψ **Corresponding angles:** Two angles are said to be a pair of corresponding angles if

a) They are on the same side of the transversal

b) One is an interior angle and the other is an exterior angle

c) They are not adjacent angles.

Note: If corresponding angles are equal, then the lines are parallel.



Ψ **Pairs of corresponding angles:** $(\angle 1, \angle 5), (\angle 3, \angle 7), (\angle 2, \angle 6), (\angle 4, \angle 8)$

Ψ **Cointerior (or) Allied angles :**

The pair of angles which are interior and on the same side of the transversal are called allied angles.

The sum of co-interior angles = 180° (where lines must be parallel)

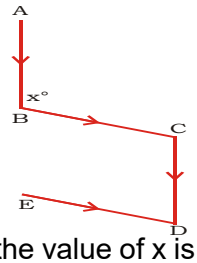
Ψ **Allied angles:** $(\angle 4, \angle 6), (\angle 3, \angle 5)$

LectureTask

TEACHING TASK

I. MCQ's with single correct answers

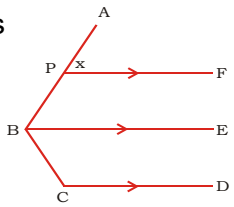
1. If angle CDE = 80^0 AB||CD, BC||DE, then the value of x is



A) 110^0 B) 100^0

C) 120^0 D)130^0

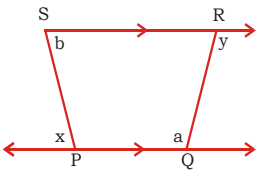
2. PF||BE||CD if angle ABC=100^0, angle of BCD =110^0 ,then the value of x is



A)30^0 B) 40^0

C) 50^0 D) 20^0

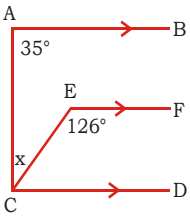
3. The sides QP and SR of Quadrilateral PQRS are produce. If PQ||SR , then



A) x+a=y+b B) x+y=a+b

C) x+b=y+a D) Both (A) (B)

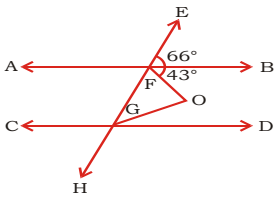
4. If AB||CD and CD||EF , then the value of x is



A) 90^0 B) 89^0

C) 92^0 D) 91^0

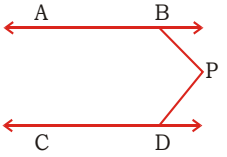
5. In the adjoining figure, $\angle$EFB =66^0, $\angle$BFO=43^0, $\angle$OGF=23^0, $\angle$OGD=y^0, then y =



A) 42^0 B) 43^0

C) 44^0 D) 41^0

6. If AB || CD and P is any point as shown in the figure, then $\angle$ABP + $\angle$BPD + $\angle$CDP is



A) 72° B) 180°

C) 540° D) 360°

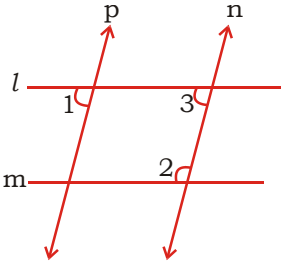
7. If $l \parallel m$ and p||n and $\angle$ 1 = 75°, then

A) $\angle$2 = $\angle$1 + 1/3 of a right angle

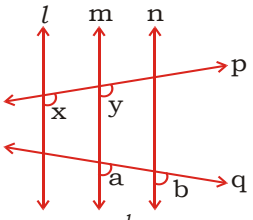
B) $\angle$2 = $\angle$1 + 2/3 of a right angle

C) $\angle$2 = $\angle$1 + 1/2 of a right angle

D) $\angle$2 = $\angle$1 + 1/6 of a right angle



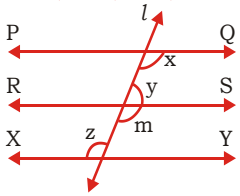
8. In the given figure l||m||n. If x = y and a = b, then



A) $l \not\| n$ B) $l < n$

C) $l > n$ D) $l \| n$

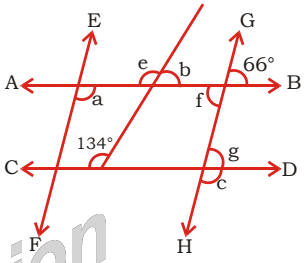
9. In the adjoining figure PQ ||l XY, also y : z = 4 : 5, then $\angle x =$



A) 100º B) 80º

C) 120º D) 110º

10. If AB ||CD, EF||GH, then which of the following is true?



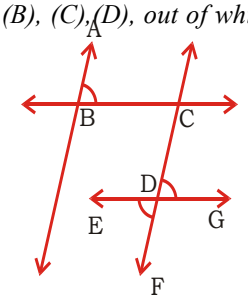
A) b = 46° B) c = 114°

C) a = 114° D) all of these

MCQ's with more than one correct answers

◆ *This section contains multiple choice questions. Each question has 4 choices (A), (B), (C), (D), out of which* ***ONE or MORE*** *is correct. Choose the correct options*

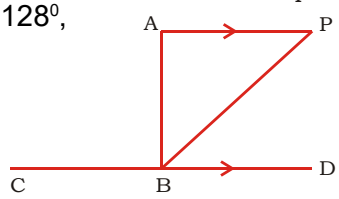
11. If AB || CF and BC || ED, then.....



A) $\angle ABC = \angle BCD$ B) $\angle FDE = \angle FDG$

C) $\angle ABC = \angle FDG$ D) $\angle FDE = \angle ABC$

12. In the given figure,AB perpenduclar CD,AP||CD, $\angle CBP = 128^0$, then $\angle ABP$ and $\angle APB$ are

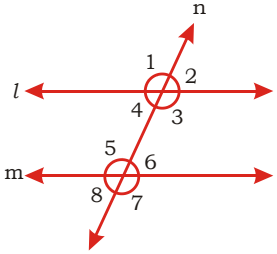


A) $\angle ABP = 36^0$ B) $\angle APB = 52^0$

C) $\angle ABP = 38^0$ D) $\angle APB = 36^0$

Assertion Reasoning Type:

◆ *This section contains certain number of questions. Each question contains Statement – 1 (Assertion) and Statement – 2 (Reason). Each question has 4 choices (A), (B), (C) and (D) out of which* ***ONLY ONE*** *is correct Choose the correct option.*



A) Both Assertion and Reason are true.

B) Both Assertion and Reason are false.

C) Assertion is true, Reason is false.

D)Assertion is false, Reason is true

13. **Assertion** : In the adjoining figure $l \| m$ is cut by the transversal 'n'.

If $\angle 1 = 70°$, then $\angle 6 = 110°$

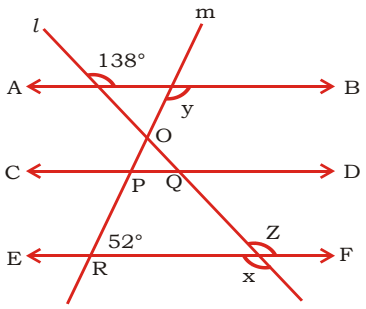
Reason : In the adjoining figure $\angle 1 = \angle 3 = \angle 5 = \angle 7$ and $\angle 2 = \angle 4 = \angle 6 = \angle 8$

Matrix Match Type:

♦ *This section contains Matrix-Match Type questions. Each question contains statements given in two columns which have to be matched. Statements (A, B, C, D) in **Column–I** have to be matched with statements (p, q, r, s) in **Column–II**. The answers to these questions have to be appropriately bubbled as illustrated in the following example.*

*If the correct matches are A-p,A-s,B-r,B-r,C-p,C-q and D-s,then the correct bubbled 4*4 matrix should be as follows:*

14. If AB||CD||EF. Where *l* and m are transversals, then

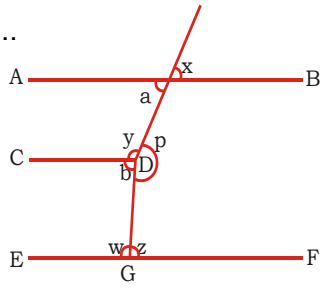


Column - I	Column - II
a) x	1) 138^0
b) y	2) 128^0
c) z	3) 142^0
d) x + z – y	4) 146^0
	5) 148^0

Comprehension Type:

♦ *This section contains paragraph. Based upon each paragraph multiple choice questions have to be answered. Each question has 4 choices (A) , (B) ,(C) and (D) out of which **ONLY ONE** is correct. Choose the correct option.*

In the given figure, if AB||CD||EF, p = 165° and 2y = 3z, then.....



15. z = ...

A) 102° B) 78° C) 63° D) 88°

16. w =.....

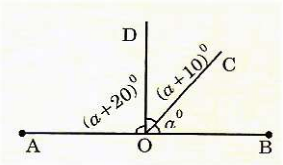
A) 102° B) 78° C) 63° D) 88°

17. x =.....

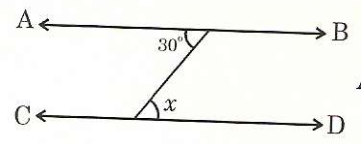
A) 102° B) 78° C) 63° D) 88°

Solve the following

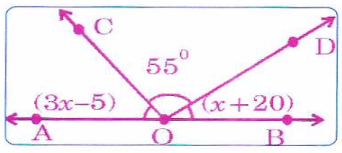
1. AOB is a line segment, OC, OD are also line segments. Find the value of a



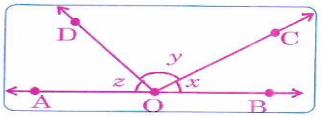
2. If AB // CD then find x.



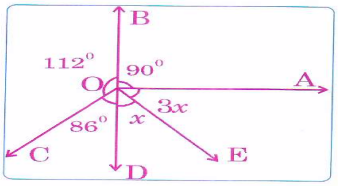
3. In the adjoining figure AOB is a straight line. find x hence find $\angle AOC$ and $\angle BOD$



4. In the adjoining figure AOB is straight line. If **x:y:z= 6:5:4** find the values of x,y,z.



5. In the adjoining figure find $\angle DOE$ and $\angle EOB$



LEARNER'S TASK

BEGINNERS (Level - I)

MCQ's with single correct answers

1. Two lines which never meet , even when they are extended infinitely are known as ...

A) Intersecting lines B) perpendicular lines

C) parallel lines D)concurrent lines

2. Angle between two parallel lines are ....

A) 0^0 B)90^0 C)180^0 D)360^0

3. Distance between two parallel lines are .....

A) Constant B) Changes C) 0 D) None

4. a straight line which intersect two (or) more given lines at different points is called is

A) Transversals B)Intersecting lines

C) concurrent lines D)Perpendicular lines

5. Two angles are said to be pair to be of alternate angles if.....

A) They are on either side of the transversal

B)Both are interior angles or exterior angles

C)They are not adjacent angles D)All the above

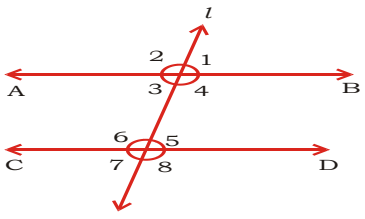
6. If the lines are parallel then the corresponding angles are .....

A) Equal B) Supplementary C) Complementary D) None

7. If the lines are parallel then the alternate angles are .....

A) Not Equal B) Supplementary C)Complementary D) Equal

8. In the given figure, AB||CD and *l* is a transversal. If $\angle 2 = (2x+30)^0$, $\angle 4 = x + 2y$ and $\angle 6 = (3y + 10)^0$, then $\angle 5$ is



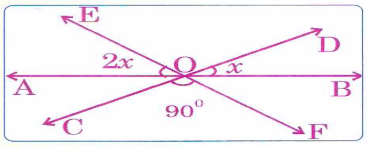
A) 60° B) 70°

C) 50° D) 80°

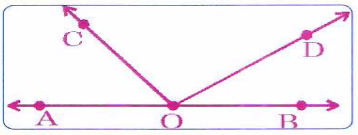
ACHIEVERS (Level - II)

Solve the following

1. In the given figure the lines AB, CD and EF intersect at a point 'O'. If $\angle BOD$ =x^0 $\angle AOE$ =2x^0 , $\angle COF$ =90^0. Find $\angle AOE$ and $\angle AOC$

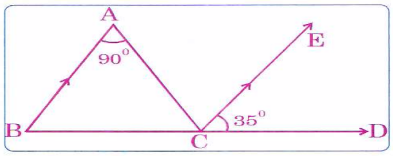


2. .In the given figure, AOB is a straight line, If $\angle AOC + \angle COD = 100^0$ and $\angle BOD + \angle COD = 146^0$ then find $\angle COD$.



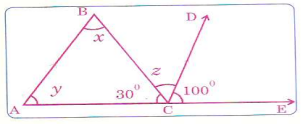
3. In the adjoining figure it is given that CE // BA, $\angle BAC = 90^0$ and $\angle ECD = 35^0$. Find

i) $\angle ACE$ ii) $\angle ACB$ iii) $\angle ABC$

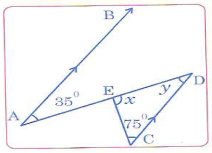


4. In each of the following figures given below AB//CD. Find the unknown angles giving reasons.

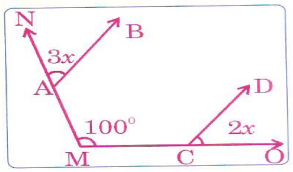
i)



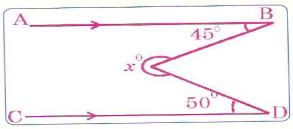
ii)



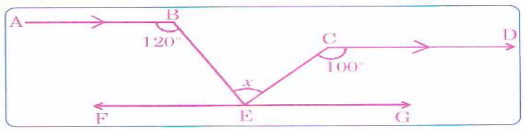
iii)



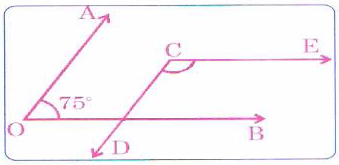
iv)



5. In the adjoining fig FG // AB, FG // CD, if $\angle ABE = 120^0$, $\angle DCE = 100^0$ find the value of x.



6. In the adjoining fig, it is given that AO // CD, OB // CE and $\angle AOB = 75^0$ find $\angle ECD$.

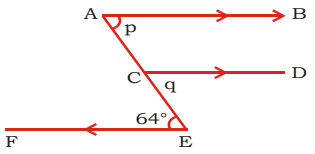


EXPLORERS (Level - III)

I. MCQ's with more than one correct answers

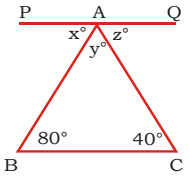
♦ *This section contains multiple choice questions. Each question has 4 choices (A), (B), (C),(D), out of which* ***ONE or MORE*** *is correct. Choose the correct options*

1. From the figure, if AB||CD||EF, then



A) $p = 64^0$ B) $q = p$
C) $q + p = 128^0$ D) $p + q = 108^0$

2. In the above figure, if PQ||BC, angle b = 80^0, angle C= 40^0 then the value of x,y,z are



A) $x = 80^0, y = 40^0, z = 60^0$ B) $x = 80^0, y = 60^0, z = 40^0$
C) $x - y = 20^0$ D) $y + z = 100^0$

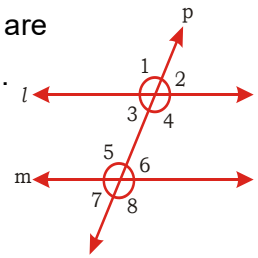
Assertion Reasoning Type:

♦ *This section contains certain number of questions. Each question contains Statement – 1 (Assertion) and Statement – 2 (Reason). Each question has 4 choices (A), (B), (C) and (D) out of which* ***ONLY ONE*** *is correct Choose the correct option.*

A) Both Assertion and Reason are true. B) Both Assertion and Reason are false.
C) Assertion is true, Reason is false. D) Assertion is false, Reason is true

3. **Assertion:** If AB||CD, EH is a transversal and FN, NG, MG, FM are bisectors of alternate angles, then FNGM is a rectangle .

Reason : FM||GN, FN||MG and $\angle FNG = \angle FMG = 90^0$ opposite angles are (i.e 90^0) and opposite sides are equal. Therefore FNGM is a rectangle.



Integer Answer Type:

4. In the adjoining figure , l||m and P is a transveral $\angle 1 = \angle 4$, then $\angle 4 + \angle 6 + \angle 3 + \angle 5$ is equal to _____ right angles

KEY

ΦΦ TEACHING TASK :

1)B 2) A 3) D 4) D 5)B 6) D 7) A 8) D 9) A 10) D 11)A,D
12)B,C 13) A 14) 1,2,1,5 15) B 16)A 17)C

ΦΦ LEARNER'STASK :

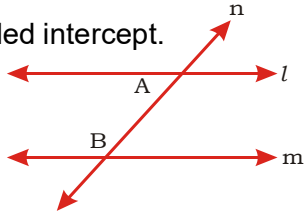
☐ **BEGINNERS :** 1)C 2) A 3) A 4) A 5)D 6)A 7)D 8) C

☐ **EXPLORERS:** 1) A,B,C 2)B,C,D 3)A 4) 4

§§ INTERCEPT AND ITS PROPERTIES

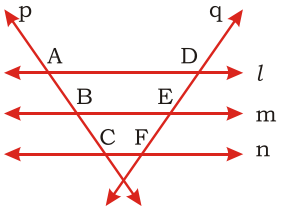
Ψ Intercept:

Consider any two lines *l* and m and a transversal n intersect *l* and m at A and B respectively. Then the distance from A to B is called intercept.



Ψ Properties:

1) If three parallel lines are intersected by two transversal then their intercepts ratio is equal and vice versa.



Example:

2) If the lines $l||m||n$ and p, q are transversals then $\frac{AB}{BC}=\frac{DE}{EF}$

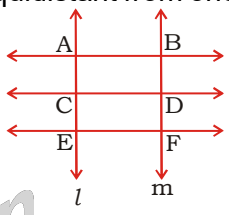
3) If intercepts are equal, then those lines are parallel.

4) If lines are parallel, then intercepts need not be equal.

Ψ Intercept Theorem:

If three parallel lines make equal intercepts on one transversal then they make equal intercepts on any other transversal as well. Any number of parallel lines which are equidistant from one another make equal intercepts on all transversals drawn to them.

When three or more parallel lines are intersected by two transversals they make intercepts on them which are in proportion.



If AC = x cm and CE = y cm, then AC : CE or $\frac{AC}{CE}=\frac{x}{y}$; BD : DF or $\frac{BD}{DF}=\frac{x}{y}$

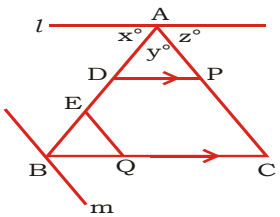
Note: 1. If a system of parallel lines makes equal intercepts on a transversal, then the distance between consecutive lines is the same

2. In a system of equidistant parallel lines intercepts made in any number of perpendicular transversals are equal.

TEACHING TASK

I. MCQ's with single correct answers

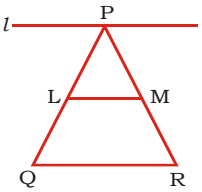
1. DP||BC and EQ||AC , then



A) BQ/QC=BE/EA B) AD/DB=AP/PC

C) Both (A) and (B) D) None

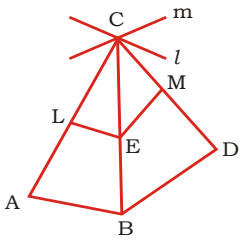
2. If LM||QR, PL/LQ = 3/5, PR=5.6cm, then PM is



A) 2.2cm B) 2.3cm

C) 2.1cm D) 2.2cm

3. If l ||LE||AB and m||EM||BD , then



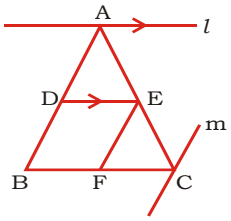
A) CL/AL=CE/EB B) CE/EB=CM/MD

C)CL/LA=CM/MD D) All of these

II. Multi Correct Answer

◆ *This section contains multiple choice questions. Each question has 4 choices (A), (B), (C),(D), out of which **ONE or MORE** is correct. Choose the correct options*

4. If m||EF||AB, l ||DE||BC and D is the midpoint of AB, then



A) E is the midpoint of AC B) F is the Midpoint of BC

C) E is not the midpoint of AC D) F is not the mid point of BC

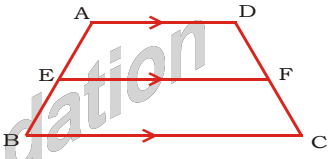
III. Reasoning Type:

◆ *This section contains certain number of questions. Each question contains Statement – 1 (Assertion) and Statement – 2 (Reason). Each question has 4 choices (A), (B), (C) and (D) out of which **ONLY ONE** is correct Choose the correct option.*

A) Both Assertion and Reason are true. B) Both Assertion and Reason are false.

C) Assertion is true, Reason is false. D) Assertion is false, Reason is true

5. ***A:*** AD||EF||BC if EB=2AE and DF = 1.5cm the, length of FC is 4cm

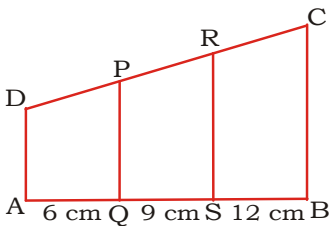


R: Three or more parallel lines intersecting any two transverals make intercepts on them in the same proportion,

IV. Comprehension Type:

◆ *This section contains paragraph. Based upon each paragraph multiple choice questions have to be answered. Each question has 4 choices (A) , (B) ,(C) and (D) out of which **ONLY ONE i**s correct. Choose the correct option.*

If AD||PQ||RS||BC. CD=30cm, then



6. The length of DP + PR is .....

A) 50/3cm B) 15(2/3)cm C) $16\frac{2}{3}$ cm D) (A) & (C)

7. The length of DC – PR is.....

A) 20cm B) 15cm C) 25cm D) 10cm

8. The length of DP + RC is .....

A)15cm B) 20cm C) 10cm D) 5cm

V. Matrix Match Type:

◆ *This section contains Matrix-Match Type questions. Each question contains statements given in two columns which have to be matched. Statements (A, B, C, D) in **Column–I** have to be matched with statements (p, q, r, s) in **Column–II**. The answers to these questions have to be appropriately bubbled as illustrated in the following example.*

*If the correct matches are A-p,A-s,B-r,B-r,C-p,C-q and D-s,then the correct bubbled 4*4 matrix should be as follows:*

9.

Column-I	Column-II
1) If a transversal 't' intersects two lines *l* and m in distinct points A and B then perpendicular to them the lines *l* and m are said to make	a) on all transversals

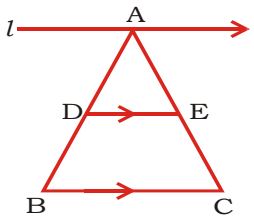
2) Two parallel lines make equal intercepts — b) Equal intersepts on any other transvarsal as well

3) If three parallel lines make equal intercepts on one transversal, then they make — c) in the same proportion

4) Three or more parallel lines intersecting any two transvelsals make intersepts on them — d) An intercept AB on 't'

Solve the following

From the given diagram



1. $DE \parallel BC$, $AD = 4x-3$, $AE = 8x-7$, $BD = 3x-1$ and $CE = 5x-3$ then find the value of x

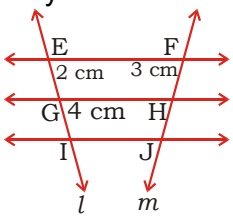
2. If $l \parallel DE \parallel BC$, $\frac{AD}{DB} = \frac{5}{8}$, AC = 3.9 cm then find AE

LEARNER'S TASK

BEGINNERS

I. MCQ's with single correct answers

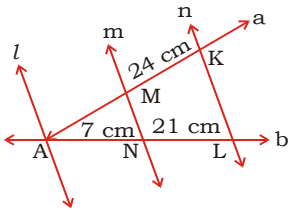
1. From the given diagram if parallel lines, EF, GH, IJ are intercepted by transversals *l* and m. Where EG = 2 cm, GI = 4 cm, FH = 3 cm, then HJ is



A) 8 cm B) 9 cm

C) 12 cm D) 6 cm

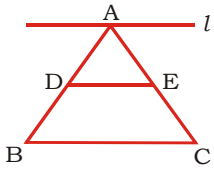
2. *l* || m || n and transversals a and b through A intersects them at A, M, K, N, L. If AN = 7 cm, NL = 21 cm, KM = 24 cm, then the length of intercept $\overline{AM}$ is



A) 8 cm B) 9 cm

C) 10 cm D) 12 cm

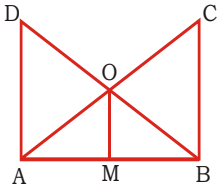
3. If *l* || ED || CB, where AB = 12 cm, AC = 16 cm, and EC = 4 cm, then the length of AD is.....



A) 6 cm B) 9 cm

C) 10 cm D) 8 cm

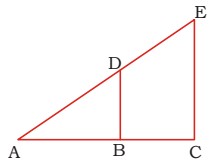
4. DA, CB, OM are each perpendicular to line segment AB where O is the point of intersection of AC and DB. If OA = 2.4 cm, OC = 3.6 cm, then AM : BM is



A) 2:1 B) 2:5

C) 2:3 D) 4:4

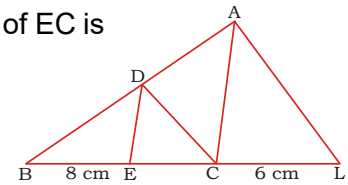
5. If BD || CE and AD : DE = 4 : 7, AB = 20 cm, then the length of BC is



A) 25 cm B) 30 cm

C) 40 cm D) 35 cm

6. From the given diagram, If CD || LA and DE || AC, then the length of EC is



A) 8 cm B) 6 cm

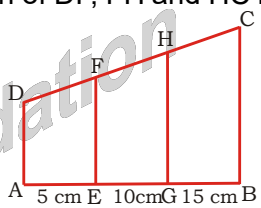
C) 4 cm D) 2 cm

EXPLORERS

II. MCQ'S with more than one correct answers

♦ *This section contains multiple choice questions. Each question has 4 choices (A), (B), (C),(D),out of which* ***ONE or MORE*** *is correct. Choose the correct options*

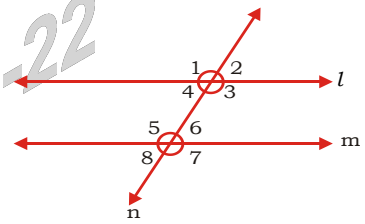
7. Given AD || EF|| HG|| BC. If CD = 60 cm, then the length of DF, FH and HC respectively are



A) 10 cm B) 20 cm

C) 30 cm D) 45 cm

8. In the Figure $l \parallel m$ and n is a transversal then



A) $\angle 1 = \angle 5$ B) $\angle 3 = \angle 5$

C) $\angle 5 = \angle 7$ D) $\angle 2 = \angle 6$

III. Assertion & reasoning

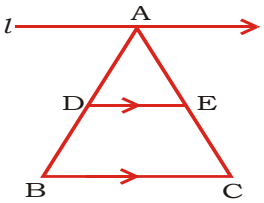
♦ *This section contains certain number of questions. Each question contains Statement – 1(Assertion) and Statement – 2 (Reason). Each question has 4 choices (A), (B), (C) and (D) out of which* ***ONLY ONE*** *is correct Choose the correct option.*

A). Both Assertion & reason are true, reason is the correct explanation of Assertion.

B). Both Assertion & reason are true, reason is not correct explanation of Assertion

C). Assertion is true, reason is false. D). Assertion is false, reason is true.

9. ***ASSERTION*** :ABC is an isosceles triangle with AB=AC. Further DE||/||BC and D is the midpoint of AB. Therefore triangle ADE is isosceles



REASON If three parallel lines make equal intercepts on one transversal, then they make equal intercepts on any other transversal as well.

10. ***ASSERTION:*** If $\overline{XY} = 228000\text{cm}$, then its length in kilometres is 228km.

REASON: A line segment extended end lessly in one direction is a ray.

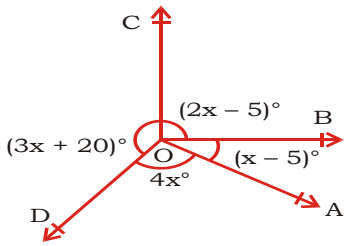
IV. Comprehension Type:

♦ *This section contains paragraph. Based upon each paragraph multiple choice questions have to be answered. Each question has 4 choices (A) , (B) ,(C) and (D) out of which **ONLY ONE i**s correct. Choose the correct option.*

From the adjoining figure,

$\angle COD = (3x + 20)^\circ, \angle COB = (2x - 5)^\circ, \angle AOB = (x - 5)^\circ$

and $\angle AOD = 4x^\circ$



11. x° = _____

A) 35° B) 36° C) 37° D) 38°

12. $\angle AOC$ = _____

A) 94° B) 95° C) 91° D) 96°

13. Reflex angle of $\angle COD$ is _____

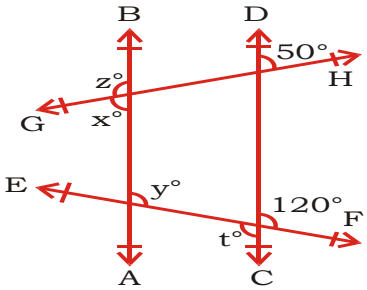
A) 235° B) 225° C) 224° D) 205°

V. MATCH THE FOLLOWING

♦ *This section contains Matrix-Match Type questions. Each question contains statements given in two columns which have to be matched. Statements (A, B, C, D) in **Column–I** have to be matched with statements (p, q, r, s) in **Column–II**. The answers to these questions have to be appropriately bubbled as illustrated in the following example.*

*If the correct matches are A-p,A-s,B-r,B-r,C-p,C-q and D-s,then the correct bubbled 4*4 matrix should be as follows:*

14. Using the given figure,



Column – I	**Column – II**
a) x° = ———	1) 120°
b) y° = _____	2) 30°
c) $(x^\circ + t)^\circ$ = _____	3) 50°
d) (z – y) = _____	4) 170°
	5) 10°

KEY

ΦΦ TEACHING TASK :

1)C 2) C 3) D 4)A,B 5)D 6)D 7)A 8)B 9) D,A B,C

ΦΦ LEARNER'STASK :

☐ **BEGINNERS :**

1)D 2) A 3) B 4) C 5)D 6)C

☐ **EXPLORERS :** 7) A,B,C 8)A,B,C,D 9-D, 10) D 11) A 12) B 13)A

14) 3,1,4,5