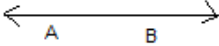
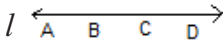
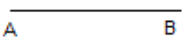


4. PLANE GEOMETRY

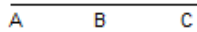
LINES AND ANGLES

- * Geometry means measurement of earth
- * Father of geometry Euclid
- * The book written by Euclid on geometry “The elements”
- * Three basic concepts of geometry are point, line and plane.
- * A point has no dimensions such as length, breadth and thickness. It has position only
- * Generally points are represented by capital letters A,B,C
- * The set of points extending infinitely on either side is called “a line”
- * Line has only length. It has no breadth.
- * A line has no end points.
- * Lines are two types 1) Straight lines 2) Curved lines
- * Line AB is represented as $\overleftrightarrow{AB}$ or $\overleftrightarrow{BA}$  Straight line
- * Lines are represented by small letters also ($\overleftrightarrow{AB}$ or l)  Curved line
- * The points lying on the same line are called collinear points

- * A, B, C, D are collinear points
- * The set of points between two points including those two points which has a fixed length is called “a line segment”
- * Line segments is part of a line 
- * Line segment has 2 end points
- * The number of unit line segments in a line segment is called “length of the line segment”
- * Length of line segment is measured in cm.
- * If the length of two line segments is same then they are called “congruent line segments”
- * The length of line segment $\overline{AB}$ is represented as AB
- * If $\overline{AB}, \overline{CD}$ are two line segments and $AB=CD$ then $\overline{AB} \cong \overline{CD}$
- * The set of points extending infinitely in all directions is called “plane”

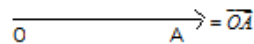
- * Plane is a flat surface having length and breadth



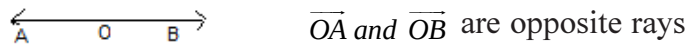
- * Plane is represented by small letters.
- * The points lying on the same plane are called “coplanar points”
- * The lines belong to same plane are called “coplanar lines”.
- * If A,B,C are collinear and B lies between A and C then $AB + BC = AC$



- * The set of points extending infinitely in one direction is called “a ray”
- * Ray is part of a line



- * $\overrightarrow{OA} \cong \overrightarrow{AO}$
- * The rays which extend opposite to each other from a point are called “opposite rays” or “vertical rays”.



- * A ray has one end point
- * The end point of a ray is called initial point.
- * The figures which are end at their starting point while they are drawing are called closed figures. Otherwise they are open figures.
- * Closed figures are closed in all sides.
Ex : Triangles, Quadrilaterals etc
- * Open figures are opened at one side.

Example :  etc

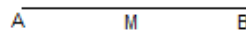
Properties of straight lines

1. A line has infinite points
2. Infinite number of lines can be drawn through one point
3. Only one line can be drawn through two distinct points
4. Two lines have only one point belong to both lines. means two lines are intersecting at one point.

5. Two lines do not have more than one common point

* If a point M is located on a line segment AB such that $AM=MB$ then

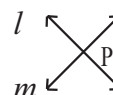
M is called midpoint of AB



* The mid point of a line segment divides it into two congruent line segments

Types of lines:

1. **Intersecting lines** : - If two lines have a common point then they are called intersecting lines. The common point is called point of intersection.



If l, m are intersecting lines then $l \cap m = \{P\}$

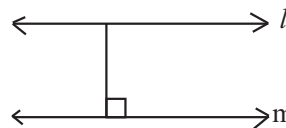
2. **Parallel lines** : - If two lines have no common point then they are called “parallel lines”

Parallel lines do not intersect

Parallel lines are represented by the symbol $//$ (Parallel to)

If l, m are parallel lines they are represented by $l // m$

The perpendicular distance between two parallel lines is same at every where.

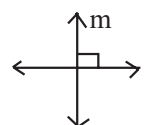


3. **Perpendicular lines**:- If the angle between two lines is 90° then they are called perpendicular lines.

The symbol for perpendicularity is $\perp$ (Perpendicular to)

If l, m are perpendicular to each other then.

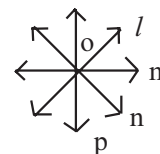
they are represented by $l \perp m$



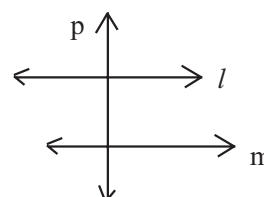
4. **Concurrent lines**:- If three or more lines have a common point then

they are called “concurrent lines”. The common point

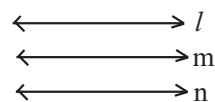
is called “point of concurrence”



5. **Transversal** :- The line which intersects two or more lines at distinct points is called “transversal”. In the adjacent figure p is transversal

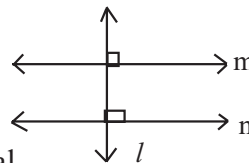


- * The lines parallel to the same line are parallel to each other $m \parallel l$ and $n \parallel l$ then $m \parallel n$.

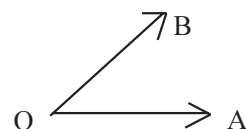


- * The lines perpendicular to the same line are also parallel to each other.

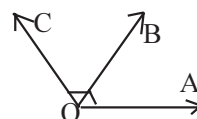
If $m \perp l$ and $n \perp l$ then $m \parallel n$.



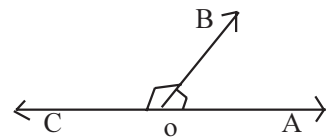
- * The angle between two parallel lines is 0°
- * The union of two rays having same common initial point is called an angle.
- * The initial point of an angle is called vertex and the rays of an angle are called arms. Here vertex = O, arms of angle = $\overrightarrow{OA}$ and $\overrightarrow{OB}$.



- * The symbol for an angle is $\angle$ (angle).
- * In the given figure above, the angle is represented by $\angle AOB$ or $\angle BOA$.
- * The unit to measure an angle is degree.
- * The right angle is divided into 90 equal parts and each part is called one degree.
- * The angles are measured by using protractor.
- * The angle divides the plane in which it lies into 3 parts.
 - 1) Interior of the angle
 - 2) Exterior of the angle
 - 3) On the angle.
- * If the measure of an angle is 0° then it is called “zero angle”
- * If the measure of an angle is more than 0° and less than 90° then it is called an “acute angle”
- * If the measure of an angle is 90° then it is called “right angle”
- * If the measure of an angle is more than 90° and less than 180° then it is called an “obtuse angle”
- * If the measure of an angle is 180° then it is called as “straight angle”
- * If the measure of an angle is more than 180° and less than 360° then it is called as “reflex angle”
- * If the measure of an angle is 360° then it is called “complete angle”
- * If sum of two angles is 180° then they are called as “supplementary angles”
- * If sum of two angles is 90° then they are called “complementary angles”
- * The angles having common vertex and common arm are called “adjacent angles” $\angle AOB$ and $\angle BOC$ are adjacent angles. O is common vertex and $\overrightarrow{OB}$ is common arm.



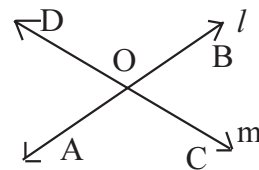
- * In the pair of adjacent angles if non common arms are opposite rays then those angles are called “linear pair”



- * If sum of adjacent angles is 180° then they are called “linear pair”

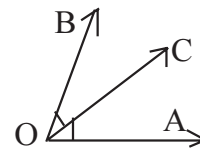
- * If two lines intersect the angles opposite to point of intersection are called “vertically opposite angles”

- * If two lines intersect each other 4 angles are formed. Among those 4 angles each pair of angles which do not have common arm are called vertically opposite angles. $\angle AOD$, $\angle BOC$ and $\angle AOC$, $\angle BOD$ are vertically opposite angles.



- * If the measure of two angles is same then they are called congruent angles.

- * The line which divides an angle into two congruent angles is called angular bisector. Here $\overrightarrow{OC}$ is bisector of $\angle AOB$.



$$\Rightarrow \angle AOC = \angle BOC.$$

- * If a transversal intersects two lines 8 angles are formed at the two intersecting points among them

i) Interior angles : - $\angle 3, \angle 4, \angle 5, \angle 6$

2) Exterior angles : - $\angle 1, \angle 2, \angle 7, \angle 8$

3) Pairs of Corresponding angles :

$$(\angle 1, \angle 5), (\angle 4, \angle 8), (\angle 2, \angle 6), (\angle 3, \angle 7)$$

4) Pairs of Alternate interior angles : -

$$(\angle 3, \angle 5), (\angle 4, \angle 6)$$

5) Pairs of Alternate Exterior angles :

$$(\angle 1, \angle 7); (\angle 2, \angle 8)$$

6) Pairs of vertically opposite angles : -

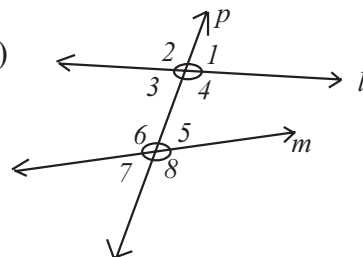
$$(\angle 1, \angle 3); (\angle 2, \angle 4); (\angle 5, \angle 7); (\angle 6, \angle 8)$$

7) Co-interior angles : $(\angle 3, \angle 6); (\angle 4, \angle 5)$

8) Co- exterior angles : - $(\angle 1, \angle 8); (\angle 2, \angle 7)$

9) Linear pairs : $(\angle 1, \angle 2); (\angle 1, \angle 4); (\angle 2, \angle 3); (\angle 3, \angle 4);$

$$(\angle 5, \angle 6); (\angle 5, \angle 8); (\angle 6, \angle 7); (\angle 7, \angle 8)$$



- * If a transversal intersects two lines then the sum of angles formed at every intersecting point is 360.

$$\angle 1 + \angle 2 + \angle 3 + \angle 4 = 360^\circ \text{ and } \angle 5 + \angle 6 + \angle 7 + \angle 8 = 360^\circ.$$

- * Sum of exterior angles is 360° $\angle 1 + \angle 2 + \angle 7 + \angle 8 = 360^\circ$

- * Sum of interior angles is 360° $\angle 3 + \angle 4 + \angle 5 + \angle 6 = 360^\circ$.

- * If a transversal intersects two parallel lines then

- 1) Each pair of corresponding angles are equal

$$\angle 1 = \angle 5, \angle 4 = \angle 8, \angle 2 = \angle 6, \angle 3 = \angle 7$$

- 2) Each pair of alternate interior angles are equal

$$\angle 3 = \angle 5, \angle 4 = \angle 6$$

- 3) Each pair of alternate exterior angles are equal

$$\angle 1 = \angle 7, \angle 2 = \angle 8$$

- 4) Each pair of vertically opposite angles are equal

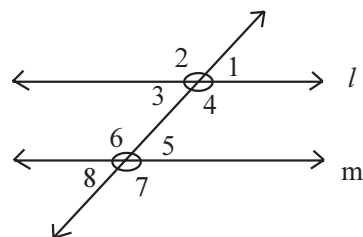
$$\angle 1 = \angle 3, \angle 2 = \angle 4, \angle 5 = \angle 7, \angle 6 = \angle 8$$

- 5) Sum of Co-interior angles is 180°

$$\angle 4 + \angle 5 = 180^\circ, \angle 3 + \angle 6 = 180^\circ$$

- 6) Sum of Co-exterior angles is 180°

$$\angle 1 + \angle 8 = 180^\circ, \angle 2 + \angle 7 = 180^\circ$$

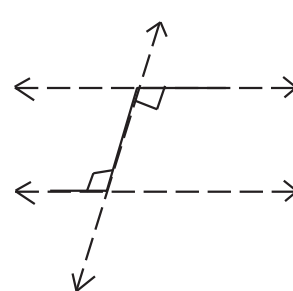
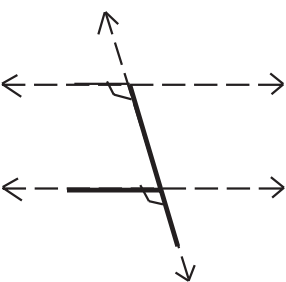
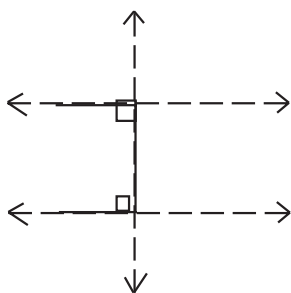
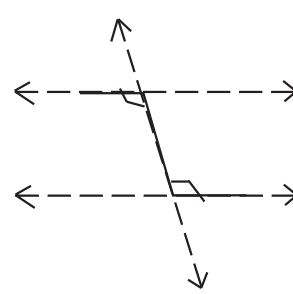
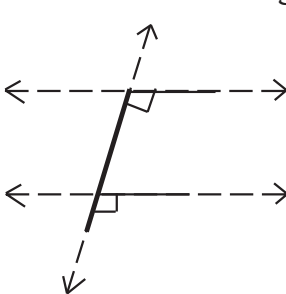
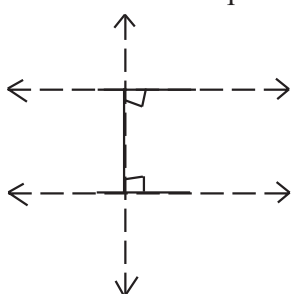


- * The no of lines can be drawn through 'n' non-collinear points is $\frac{n(n-1)}{2}$ ($n \neq 1$)

- * The number of diagonals drawn to a polygon of n sides is $\frac{n(n-3)}{2}$

- * The number of line segments can be drawn through n collinear points is $\frac{n(n-1)}{2}$

- * If a transversal intersects two parallel lines then “F” shaped angles represents corresponding angles “Z” shaped angles represents alternate interior angles and “C” shaped angles represents co-interior angles.



SOLVED EXAMPLES

1. Find the measure of following angles?

1) $\frac{1}{6}$ of right angle

ii) $1\frac{1}{2}$ of right angle

iii) $\frac{2}{5}$ of straight angle

Sol : Right angles $= 90^\circ$

straight angle $= 180^\circ$

i) $\frac{1}{6} \times 90 = 15^\circ$

ii) $1\frac{1}{2} \times 90 = \frac{3}{2} \times 90 = 3 \times 45 = 135^\circ$

iii) $\frac{2}{5} \times 180 = 2 \times 36 = 72^\circ$

2. If x and $x+30$ are two complementary angles then find x ?

Sol : $x + x + 30 = 90^\circ \Rightarrow 2x + 30 = 90^\circ$

$\Rightarrow 2x = 90 - 30 = 60^\circ \Rightarrow x = 60/2 = 30^\circ$

3. One angle is 30° less than its supplementary angle. find those angles.

Sol : One angle $= x$ (say). Its supplement $x-30$

$x + x - 30 = 180^\circ \Rightarrow 2x = 180 + 30$

$\Rightarrow 2x = 210$

$\Rightarrow x = 210/2 = 105^\circ$

one angle $= 105^\circ$

Its supplementary angle $= 105 - 30 = 75^\circ$

4. Find the angle which is $\frac{2}{5}$ of its supplementary angle?

Sol :- One angle $= x$ (ray) . Its supplement $= \frac{2}{5}x$

$\therefore x + \frac{2}{5}x = 180^\circ \Rightarrow \frac{5x+2x}{5} = 180^\circ \Rightarrow 7x = 180 \times 5$

$7x = 900 \Rightarrow x = (900/7)^\circ$

Its supplementary angle $= \frac{2x}{5} = \frac{2}{5} \times 900/7 = (360/7)^\circ$

5. In the adjacent figure $\overleftrightarrow{AB}, \overleftrightarrow{CD}, \overleftrightarrow{EF}$ intersect at O $\angle COE = 45^\circ$ and $\angle AOF = 90^\circ$ then find $\angle BOD$?

Let $\angle BOD = x$

$\angle FOD = \angle COE = 45^\circ$ (vertically opposite angles)

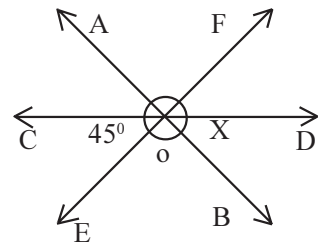
$\angle AOF = 90^\circ$

But AOB is a straight line

$\therefore x + 45 + 90 = 180^\circ$

$\Rightarrow x = 180 - 135 = 45^\circ$

$\therefore \angle BOD = 45^\circ$



6. In the adjacent figure $\overline{AB} \parallel \overline{CD}$. $\angle CDM = 150^\circ$

$\angle BMD = 64^\circ$ and $\angle ABM = x$ then find x ?

Solve : - Draw $\overline{EF} \parallel \overline{AB} \parallel \overline{CD}$ through M

Let $\angle EMB = y$ then $\angle EMD = 64 - y$

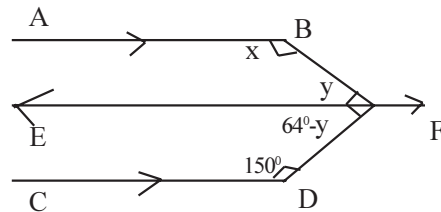
$\therefore \overline{EF} \parallel \overline{CD}$ and $\overline{HD}$ transversal.

$150 + 64 - y = 180^\circ$ (Co - interior angles)

$$-y = 180 - 150 - 64 = -34^\circ \Rightarrow y = 34^\circ$$

$\therefore \overline{AB} \parallel \overline{EF}, \overline{BM}$ transversal, $x + y = 180^\circ$ ($\because$ co-interior angles)

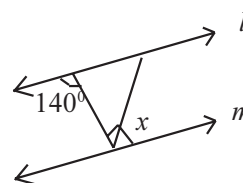
$$\Rightarrow x + 34 = 180^\circ \Rightarrow x = 180 - 34 = 146^\circ$$



7. In the adjacent figure $l \parallel m$. Find x ?

$l \parallel m$, $140 = 90 + x$ (Alternate interior angles)

$$x = 140 - 90 = 50^\circ$$



8. In the given figure, $l \parallel k$ then find $a + b$?

Solve : Draw $m \parallel l \parallel k$ through O

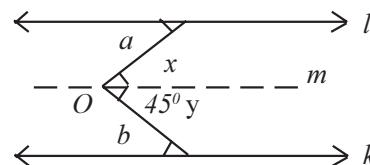
$a = x$ (Alternative interior angles)

$b = y$ (Alternative interior angles)

$$\therefore a + b = x + y$$

but $x + y = 45^\circ$

$$\therefore a + b = 45^\circ$$



9. In the adjacent figure $\overline{AB} \parallel \overline{CD}$ Find the values of p and q ?

Solve : $\angle EGB = \angle AGF = 65^\circ$ (Vertically opposite angles)

$\angle GHD = \angle AGH = 65^\circ$ (Alternate inteior angles)

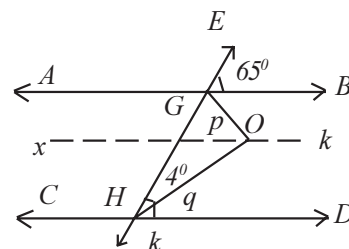
$$\Rightarrow 40 + q = 65 \Rightarrow q = 65 - 40 = 25^\circ$$

Draw a line XY parallel to $\overline{AB}$ and $\overline{CD}$ through O

$\angle XOG = \angle BGO = 45^\circ$ (Alternative interior angles)

$\angle XOH = \angle OHD = 25^\circ$ (Alternative interior angles)

$$p = 45 + 25 = 70^\circ$$



10. In the adjacent figure $\overline{AB} \parallel \overline{CD}, \overline{CD} \parallel \overline{EF}$ and $y : z = 3 : 7$ then find values of x, y, z and p ?

Solve $AB \parallel EF$. $y : z = 3 : 7$

$x + y = 180^\circ$ (Co- interior angles) - (1)

$P + z = 180^\circ$ (Co - interior angles)

But $y = p$ (vertically opposite angles)

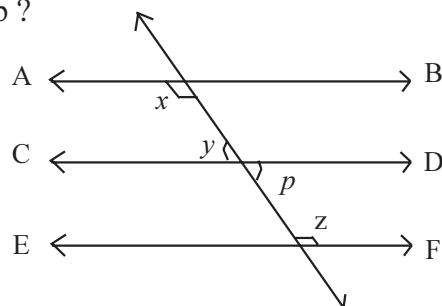
$$\therefore y + z = 180^\circ \quad - (2)$$

$$\therefore x + y = y + z \Rightarrow x = z$$

$$y : z = 3 : 7, \therefore y = \frac{3}{10} \times 180^\circ, z = \frac{7}{10} \times 180^\circ$$

$$= 54^\circ \quad = 126^\circ$$

$$\therefore x = z = 126^\circ, p = y = 54^\circ$$



11. From the adjacent figure find $x + y$

solve $35 + z + y = 180^\circ$ (angles on straight line)

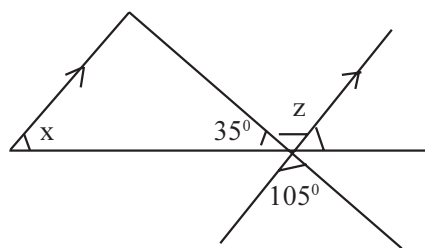
But $z = 105^\circ$ (Vertically opposite angles)

$$\therefore y = 180 - 35 - 105 = 180 - 140 = 40^\circ$$

But $x = y$ (corresponding angles)

$$\therefore x = 40^\circ$$

$$x + y = 40 + 40 = 80^\circ$$



EXERCISE

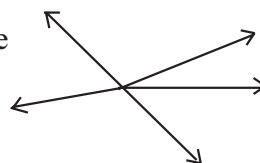
LEVEL -1

1. Which of the following is not a polygon []



2. The no. of angles formed in the adjacent figure []

- a) 2 b) 5
c) 4 d) more than 5

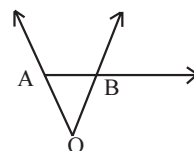


3. The shortest distance between any two points is called []

- a) Line segment b) Angle c) Curve d) Chord

4. Which represents a ray in the adjacent figure? []

- a) OA b) OB
c) BA d) AB

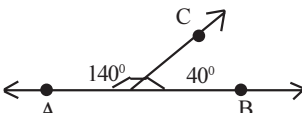
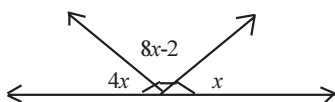
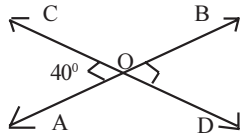
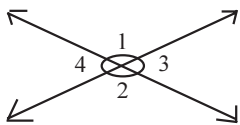


5. The number of diagonals of a octagon is []

- a) 5 b) 17 c) 8 d) 20

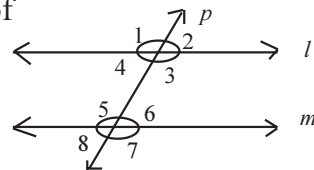
6. The complement of 25° is []

- a) 65° b) 155° c) 25° d) 75°

7. Complementary angles are always []
 a) Right angles b) Acute angles c) Obtuse angles d) Can't say
8. The supplementary angle of 20° is []
 a) 70° b) 160° c) 20° d) 180°
9. In the adjacent figure $\angle AOC$ and $\angle BOC$ are called []
 a) straight angle
 b) vertically opposite angle
 c) Linear pair
 d) None of these
- 
10. The line which intersects two or more lines at distinct points is called []
 a) Intersecting lines b) Parallel lines
 c) Reflecting lines d) Transversal
11. In the adjacent figure the value of x is []
 a) 14° b) 180°
 c) 360° d) 36°
- 
12. In the adjacent figure PQ is []
 a) Line b) Straight line c) Line segment d) None of these
13. If two supplementary angles are equal then their measures are ... []
 a) $90^\circ, 90^\circ$ b) $45^\circ, 45^\circ$ c) $180^\circ, 180^\circ$ d) $135^\circ, 135^\circ$
14. The angle between the hands of a clock at 4.30 O' clock is []
 a) 45° b) 90° c) 180° d) 60°
15. If the ratio of two supplementary angles is 7 : 11 then their values are ... []
 a) $70^\circ, 120^\circ$ b) $60^\circ, 120^\circ$ c) $70^\circ, 110^\circ$ d) $50^\circ, 130^\circ$
16. The value of $\angle BOD$, if $\angle AOC = 40^\circ$ in the figure []
 a) 140° b) 50°
 c) 160° d) 40°
- 
17. Which is false among the following from the given figure
 a) $\angle 1 = \angle 2$ b) $\angle 1 + \angle 3 = 180^\circ$
 c) $\angle 1 = \angle 4$ d) $\angle 3 = \angle 4$
- 
18. The supplement of an acute angle is []
 a) obtuse angle b) Right angle
 c) Acute angle d) 180°

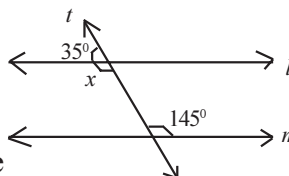
19. In the adjacent figure $\angle 1 = 135^\circ$ then the values of $\angle 2, \angle 3, \angle 4$ respectively are

a) $135^\circ, 45^\circ, 135^\circ$ b) $45^\circ, 135^\circ, 45^\circ$
c) $45^\circ, 45^\circ, 135^\circ$ d) All the above



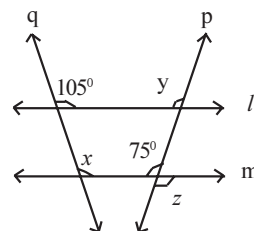
20. The value of x from the adjacent figure is

a) 35° b) 180°
c) 145° d) None of these



21. From the adjacent figure $x + y + z = \dots$

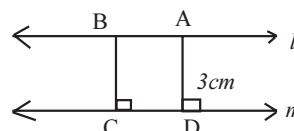
a) 255° b) 250°
c) 355° d) 360°



22. In the adjacent figure $l \parallel m$.

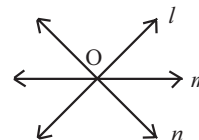
The perpendicular distance AD between them is 3cm, then BC =

a) Can't say b) less than 3cm
c) more than 3cm d) 3cm



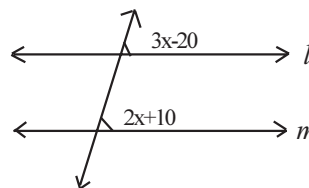
23. In the adjacent figure the lines l, m, n are called

a) Intersecting lines b) Concurrent lines
c) a and b d) None of these



24. In the adjacent figure $l \parallel m$ then the value of x is

a) 60° b) 80°
c) 110° d) 30°

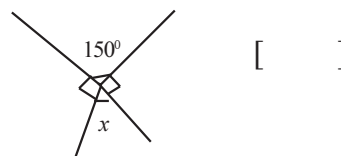


25. The supplementary angle of $90 - x$ is

a) $90 - x$ b) $90 + x$ c) 90 d) $x - 90$

26. The value of x in the given figure is

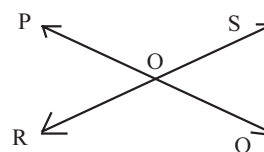
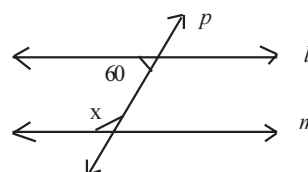
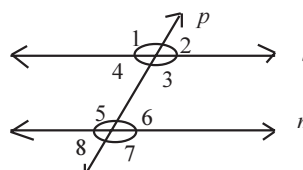
a) 60° b) 50°
c) 30° d) 80°



27. $\angle a : \angle b = 7 : 5$, $\angle a + \angle b = 180^\circ$ then $\angle a - \angle b = \dots$ []

a) 30° b) 75° c) 65° d) 90°

28. The arms of $\angle AOB$ are []
 a) $\overline{AB}, \overline{BA}$ b) $\overline{AO}, \overline{BO}$ c) $\overline{OA}, \overline{OB}$ d) All the above
29. The end of points of line segment, ray and line respectively []
 a) 0,1,2 b) 1,2,0 c) 2,1,0 d) 0,2,1
30. If $l \perp n$ and $m \perp n$ then which of the following is true []
 a) $l \parallel m$ b) $l \perp m$ c) $l \perp m \perp n$ d) $l \parallel m \parallel n$
31. The line segment of a polygon is called []
 a) line segment b) side c) diagonal d) b and c
32. The part of a line which has two end points is called []
 a) Line b) Line segment c) Ray d) Angle
33. The geometrical figure which has no dimensions is []
 a) Line b) Plane c) Linesegment d) Point
34. A line segment contains []
 a) Definite length and no end points b) Indefinite length and no end points
 c) Definite length and end points d) None of these
35. If one pair of adjacent angles are supplementary then they form []
 a) Corresponding angles b) Vertically opposite angles
 c) Linear pair d) Ray
36. In the adjacent figure the corresponding angles are []
 a) $\angle 1, \angle 5$ b) $\angle 2, \angle 6$
 c) $\angle 3, \angle 7$ d) all the above
37. If the difference between two complementary angles is 12° then their measures are .. []
 a) $51^\circ, 49^\circ$ b) $51^\circ, 39^\circ$ c) $60^\circ, 30^\circ$ d) $50^\circ, 40^\circ$
38. In the adjacent figure $l \parallel m$. 'p' is transversal then $x =$ []
 a) 60° b) 30°
 c) 120° d) 130°
39. The supplementary angles among the following are []
 a) $50^\circ, 40^\circ$ b) $150^\circ, 30^\circ$ c) $110^\circ, 90^\circ$ d) $40^\circ, 50^\circ$
40. In the adjacent figure. $\angle POR = 50^\circ$ then $\angle ROQ =$ []
 a) 130° b) 50°
 c) 40° d) 90°

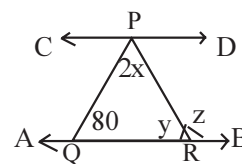


LEVEL -2

1. In the given figure, $\overline{AB} \parallel \overline{CD}$.

Then values of x, y, z are

- a) $20^\circ, 60^\circ, 120^\circ$ b) $60^\circ, 30^\circ, 150^\circ$
c) $50^\circ, 60^\circ, 110^\circ$ d) All the above

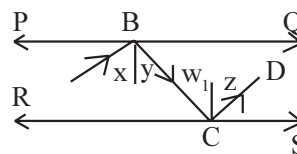


2. In the adjacent figure $\overline{PQ}, \overline{RS}$ are two plane mirrors arranged opposite to each other.

Incident ray $\overline{AB}$ strikes $\overline{PQ}$ at B and the reflected ray $\overline{CD}$ strikes $\overline{RS}$ at C.

Then what can you say about $\overline{AB}$ and $\overline{CD}$?

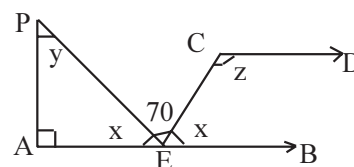
- a) $\overline{AB} \perp \overline{CD}$ b) $AB = CD$
c) $\overline{AB} \parallel \overline{CD}$ d) $AB + CD = AC$



3. In the given figure $\overline{AB} \parallel \overline{CD}$,

then $x + y + z = \dots\dots\dots$

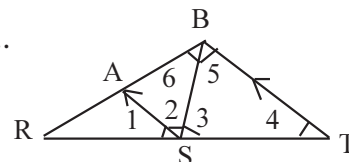
- a) 215° b) 70°
c) 145° d) 95°



4. In the adjacent figure $\overline{AS} \parallel \overline{BT}$. $\angle 4 = \angle 5$.

$\overline{SB}$ bisects $\angle AST$ then value of $\angle 1$ is =

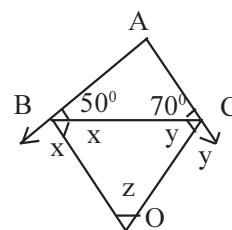
- a) 30° b) 40°
c) 50° d) 60°



5. In the adjacent figure ABC is a triangle.

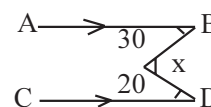
$\angle B = 50^\circ, \angle C = 70^\circ$. If $\overline{AB}, \overline{AC}$ are produced their exterior angular bisectors intersect at O. then $Z = \dots\dots\dots$

- a) 55° b) 60°
c) 65° d) 130°



6. In the adjacent figure the value of x is

- a) 30° b) 20°
c) 10° d) 50°

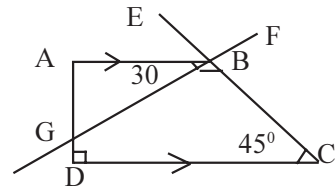


7. If an angle is 45° less than twice its supplement, then the biggest angle is

- a) 75° b) 100°
c) 120° d) 105°

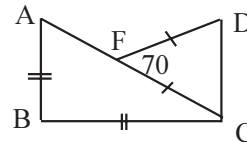
8. In the adjacent figure $\angle EBF = \dots\dots\dots$

a) 70° b) 105°
c) 150° d) 60°



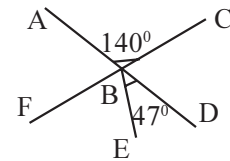
9. In the adjacent figure $\angle BCD = \dots\dots\dots$

a) 150° b) 100°
c) 70° d) 130°



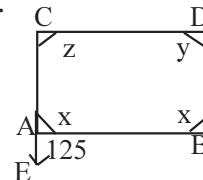
10. In the given figure $\angle EBF = \dots\dots\dots$

a) 93° b) 140°
c) 47° d) 107°



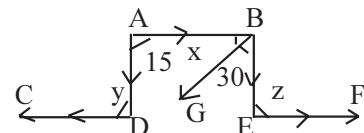
11. From the adjacent figure the value of $x + y$ is

a) 125° b) 55°
c) 180° d) 65°



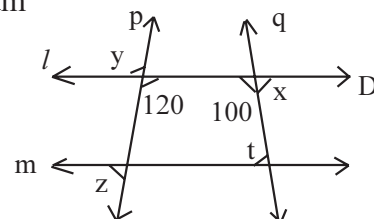
12. In the adjacent figure the value of x, y, z are

a) $35^\circ, 115^\circ, 65^\circ$ b) $40^\circ, 50^\circ, 60^\circ$
c) $15^\circ, 25^\circ, 75^\circ$ d) $55^\circ, 85^\circ, 25^\circ$



13. In the adjacent figure $l \parallel m$, then find the sum of all angles represents by alphabets

a) 360° b) 340°
c) 300° d) 400°

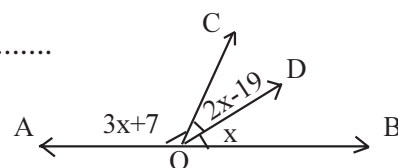


14. If the 7 times of complement of an angle is equal to 10 less than the 3 times of its supplement then the measure of that angle is

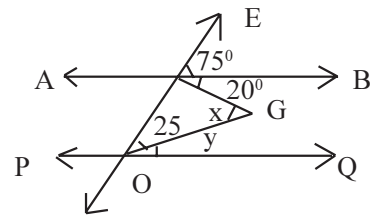
a) 90° b) 180° c) 35° d) 25°

15. If $\overline{AOB}$ is a straight line find $\angle COD$

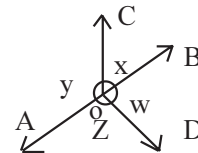
a) 32° b) 45°
c) 192° d) 103°



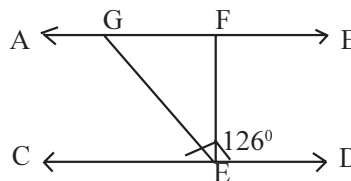
16. In the adjacent figure $\overline{AB} \parallel \overline{PQ}$.
then values of x and y are
- a) $x = 50^\circ$, $y = 70^\circ$ b) $x = 75^\circ$, $y = 85^\circ$
c) $x = 70^\circ$, $y = 50^\circ$ d) $x = 85^\circ$, $y = 75^\circ$



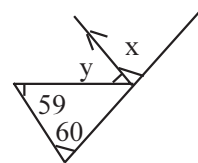
17. In the adjacent figure if $x + y = w + z$
then $\angle AOB = \dots\dots\dots$
- a) 180° b) 360°
c) 270° d) 95°



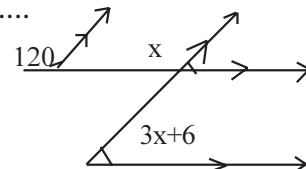
18. In the given figure $\overline{AB} \parallel \overline{CD}$. $\overline{EF} \perp \overline{CD}$
and $\angle GED = 126^\circ$
- a) 126° b) 180°
c) 54° d) 36°



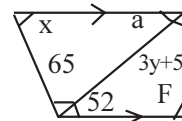
19. In the adjacent figure the lines having arrows
are parallel. then find values of x and y ?
- a) 50° , 69° b) 60° , 59°
c) 61° , 79° d) 67° , 50°



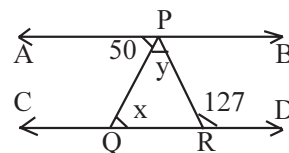
20. From the adjacent figure find the unknown angles
- a) 60° , 18° b) 78°
c) 60° , 60° d) 60° , 120°



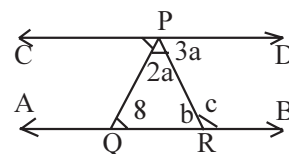
21. From the adjacent figure the sum of x and y is
- a) 63° , 11° b) 11° , 63°
c) A and B d) 74°



22. From the adjacent figure $\overline{AB} \parallel \overline{CD}$. then the
values of x and y respectively are
- a) 50° , 127° b) 50° , 77°
c) 77° , 50° d) 127° , 50°

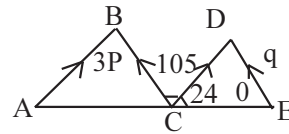


23. In the adjacent figure $\overline{AB} \parallel \overline{CD}$ then
the values of a , b , c are
- a) 20° , 60° , 120° b) 30° , 70° , 130°
c) 60° , 90° , 180° d) None of these



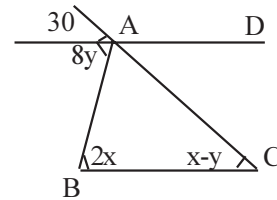
24. In the adjacent figure $\overline{AB} \parallel \overline{CD}$ and $\overline{BC} \parallel \overline{DE}$ then find the value of P,Q is

- a) $P = 51^\circ$, $q = 35^\circ$ b) $P = 105^\circ$, $q = 35^\circ$
c) $P = 35^\circ$, $q = 51^\circ$ d) $P = 35^\circ$, $q = 105^\circ$



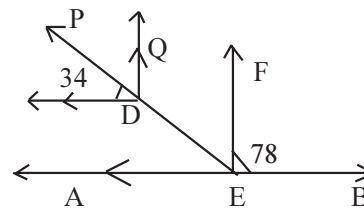
25. In the adjacent figure $\overline{AD} \parallel \overline{BC}$ then the values of $\angle B$ and $\angle C$ are

- a) 80° , 30° b) 40° , 10°
c) 40° , 70° d) 30° , 10°



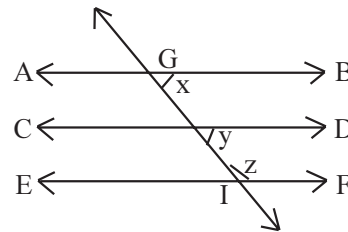
26. The value of $\angle PDQ$ in the adjacent figure is

- a) 34° b) 68°
c) 112° d) 78°



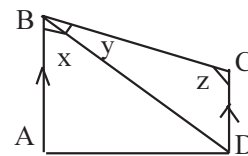
27. In the adjacent figure $\overline{AB} \parallel \overline{CD} \parallel \overline{EF}$ and $y : z = 2 : 3$. then the value of x is

- a) 108° b) 180°
c) 72° d) 36°



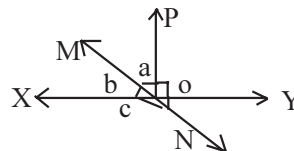
28. In the given figure $\overline{AB} \parallel \overline{CD}$. $x = \frac{4}{3}y$ and $y = \frac{3}{8}z$ then $x + y + z =$

- a) 180° b) 108°
c) 360° d) none of these



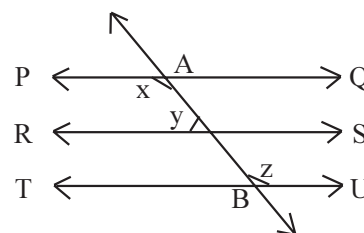
29. In the adjacent figure $a : b = 2 : 3$ then the value of C is

- a) 54° b) 126°
c) 36° d) 90°



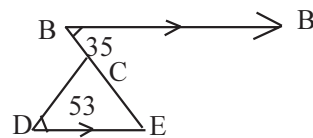
30. In the adjacent figure $\overline{PQ} \parallel \overline{RS} \parallel \overline{TU}$. $\overline{AB}$ is transversal and $y : z = 3 : 7$ then $x =$

- a) 100° b) 370°
c) 180° d) 126°



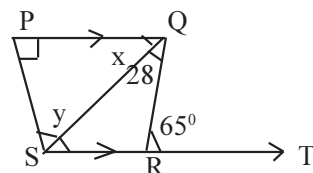
31. In the adjacent figure $\overline{AB} \parallel \overline{DE}$. find $\angle DCE$?

a) 92° b) 53°
c) 35° d) 88°



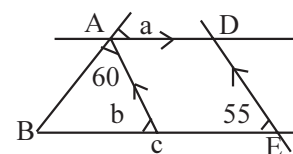
32. In the given figure $\overline{PQ} \perp \overline{PS}$ and $\overline{PQ} \parallel \overline{SR}$ then the value of $x - y$ is

a) 37° b) 53°
c) 16° d) -16°



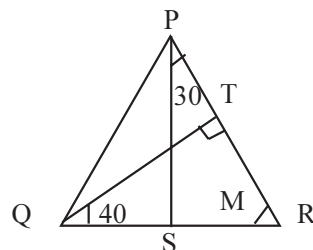
33. The adjacent figure $\overline{AD} \parallel \overline{BE}$ and $\overline{AC} \parallel \overline{DE}$. Find the values of a and b ?

a) $a = 55^\circ$, $b = 65^\circ$ b) $a = 65^\circ$, $b = 55^\circ$
c) $b = 65^\circ$, $a = 75^\circ$ d) All the above



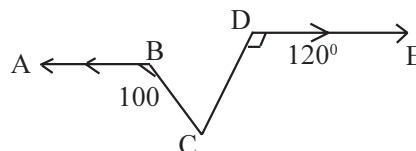
34. In the figure $\overline{QT} \parallel \overline{PR}$, $\angle TQR = 40^\circ$ and $\angle SPR = 30^\circ$, the value of x is

a) 40° b) 90°
c) 50° d) 70°



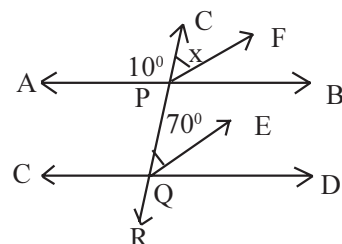
35. In the adjacent figure $\overline{AB} \parallel \overline{DE}$. then $\angle BCD = \dots\dots\dots$

a) 40° b) 60°
c) 80° d) 50°



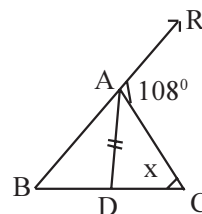
36. In the adjacent figure $\overline{AB} \parallel \overline{CD}$ and $\overline{PF} \parallel \overline{QE}$. Then the difference between the sum of x and y and difference between x and y is

a) 70° b) 10°
c) 60° d) 20°



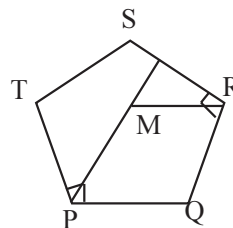
37. In the adjacent figure $\overline{AD}$ divides $\angle BAC$ in the ratio 1 : 3 and $AD = DB$. Find x ?

- a) 90° b) Right angle
c) a and b d) 18°



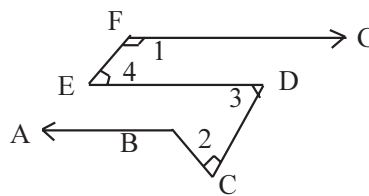
38. In the given figure PQRST is a regular pentagon. $\overline{PL}$ intersects $\overline{RS}$ at L which is bisector of $\angle TPQ$ and the bisector of $\angle SRQ$ intersects $\overline{PL}$ at M. then $\angle RML = \dots\dots$

- a) 36° b) 144°
c) 108° d) 72°



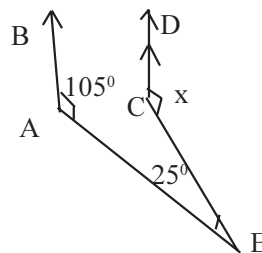
39. In the adjacent figure, $\overline{AB} \parallel \overline{DE}, \overline{DE} \parallel \overline{FG}, \overline{CD} \parallel \overline{EF}$, $\angle 2 = 55^\circ$ and $\angle 4 = 60^\circ$. Find the values of $\angle 1$ and $\angle 3$

- a) $\angle 1 = 60^\circ, \angle 3 = 120^\circ$
b) $\angle 1 = 120^\circ, \angle 3 = 60^\circ$
c) $\angle 1 + \angle 3 = 180^\circ$
d) All the above



40. In the adjacent figure $\overline{AB} \parallel \overline{CD}$ then the value of x is

- a) 70° b) 105°
c) 130° d) 50°



PLANE GEOMETRY LINES AND ANGLES

KEY

LEVEL - 1

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

21	A
22	D
23	B
24	D
25	B
26	C
27	A
28	C
29	C
30	A
31	B
32	B
33	D
34	C
35	C
36	D
37	B
38	C
39	B
40	A

LEVEL - 2

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

21	D
22	B
23	A
24	C
25	A
26	B
27	C
28	A
29	B
30	D
31	A
32	D
33	B
34	C
35	A
36	D
37	C
38	A
39	B
40	C