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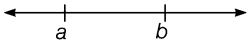
Geometry

Point

A point has no length or breadth. It is an exact location in space.

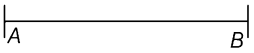
Line

A line has no end point. It is of infinite length. We cannot draw a line on paper but it represented by a diagram.



Line Segment

A line segment has two end points. It has a definite length. We can draw it on paper.



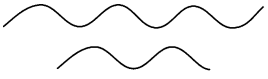
Ray

A ray has one fixed starting point but no end point.

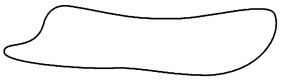
Curved Line

Curves are everything you draw without lifting the pencil from the paper.

e.g. This is an open curve.



This is a closed curve.



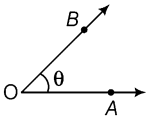
Plane

A plane is concept which can only be visualised by any level surface like table top, floor of a room etc. All these surfaces have edges whereas a plane stretches endlessly on all sides like a line.

Angles

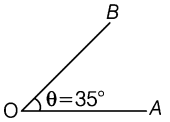
An angle is formed by two rays with a common initial point.

Here, $\angle AOB = \theta$



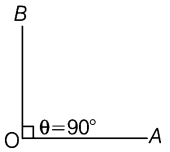
Acute Angle

Angle less than 90° is called acute angle, e.g. 25°, 35°, 40° 60° are all acute angles.



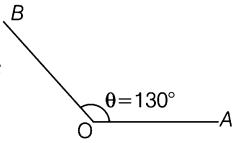
Right Angle

Angle of 90° is called right angle.



Obtuse Angle

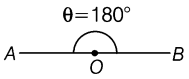
Angle greater than 90° and less than 180° is called obtuse angle, e.g. 98°, 130°, 145°, 178° are all obtuse angles.



Straight Angle

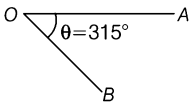
Angle of 180° is called straight angle.

1 Straight angle = 2 Right angles

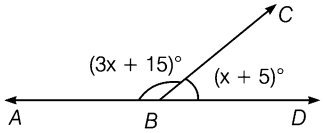


Reflex Angle

Angle which is greater than 180° and less than 360° is known as reflex angle, e.g. 185°, 190° ,280°, 355° are all reflex angles.



Example 1 In the given figure, find x.



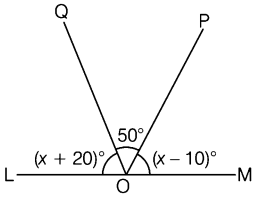
(a) 50° (b) 55°
(c) 40° (d) 45°

Sol. *(c)* $\angle ABC + \angle DBC = 180°$ (Straight line)

$\Rightarrow \quad (3x + 15)° + (x + 5)° = 180°$

$\Rightarrow \quad 4x = 160° \Rightarrow x = 40°$

Example 2 In the figure given below, LOM is a straight line. What is the value of x?



(a) 60° (b) 50° (c) 40° (d) 45°

Sol *(a)* From the given figure,

$\angle LOQ + \angle QOP + \angle POM = 180$ (straight line)

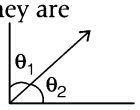
$\therefore \quad (x° + 20°) + 50° + (x° - 10°) = 180°$

$\Rightarrow \quad 2x° + 60° = 180° \Rightarrow 2x° = 120° \Rightarrow x° = 60°$

Relation between Two Angles

Complementary Angles

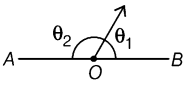
If the sum of two angles is 90°, then they are called complementary angles of each other. As angles of 60° and 30° and 45° and 45° are complementary angles of each other.



$$\theta_1 + \theta_2 = 90°$$

Supplementary Angles

If sum of two angles is 180°, then these two angles are called supplementary angles of each other. As angle of 100° and 80° are supplementary angles of each other.



$$\theta_1 + \theta_2 = 180°$$

Example 3 An angle θ° is one-fourth of its supplementary angle. What is the measure of the angle θ° ?

(a) 36° (b) 150° (c) 54° (d) 40°

Sol. *(a)* If the sum of two angles is 180°, the angles are said to be supplementary.

$\therefore$ The supplementary angle of θ° is $(180° - \theta°)$.

Given that, $\theta° = \frac{1}{4}(180° - \theta°)$

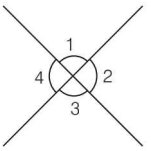
$\Rightarrow \quad 4\theta° = 180° - \theta°$

$\Rightarrow \quad 5\theta° = 180°$

$\Rightarrow \quad \theta° = \frac{180°}{5} = 36°$

Vertically Opposite Angles

When two lines intersect each other, then angles formed opposite to each other are known as vertically opposite angles. Vertically opposite angles are equal.

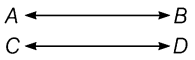


$$\angle 1 = \angle 3$$

$$\angle 2 = \angle 4$$

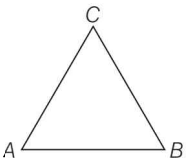
Parallel Lines

Lines which do not intersect each other are known as parallel lines. Distance between two parallel lines always remains constant.



Triangle

Figure which is surrounded by three sides is called a triangle. There are three sides and three angles in a triangle.



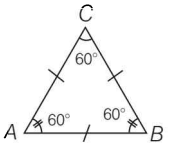
- Sum of three angles of a triangle is 180°.

  $\angle A + \angle B + \angle C = 180°$
- Sum of any two sides of a triangle is greater than the third side.

On the Basis of Sides

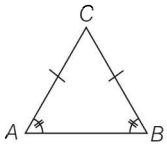
(i) **Equilateral Triangle** A triangle having all sides equal is known as equilateral triangle. In this triangle all angles are also equal to each other and value of each angle is 60°.

$$AB = BC = CA$$



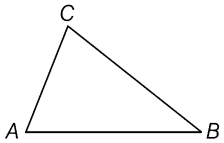
(ii) **Isosceles Triangle** A triangle having any two sides equal is called an isosceles triangle.

$$AC = CB$$



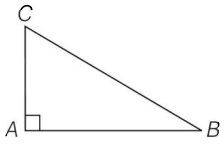
(iii) **Scalene Triangle** A triangle having all sides of different lengths is called a scalene triangle.

$$AB \neq BC \neq CA$$

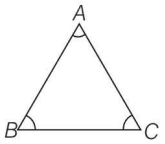


On the Basis of Angles

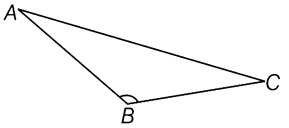
(i) **Right Angled Triangle** A triangle in which one of the angle is 90°.



(ii) **Acute Angled Triangle** A triangle in which all the angles are acute (less than 90°).



(iii) **Obtuse Angled Triangle** A triangle in which one of the angle is obtuse (greater than 90°).



Example 4 The angles of triangle are in the ratio 3 : 5 : 7. The triangle is
(a) Right angled triangle
(b) Acute angled triangle
(c) Obtuse angled triangle
(d) None of these

Sol. *(b)* Let the angle measure $(3x)°$,$(5x)°$ and $(7x)°$

Then, $3x + 5x + 7x = 180$

$\Rightarrow$ $15x = 180 \Rightarrow x = 12$

$\therefore$ These angles are $36°$,$60°$ and $84°$

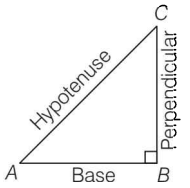
Hence, the triangle is acute angled.

Pythagoras Theorem

In a right angled triangle

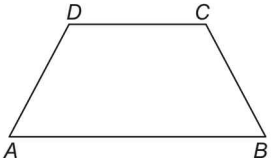
$(\text{Hypotenuse})^2 = (\text{Base})^2 + (\text{Perpendicular})^2$

$\Rightarrow (AC)^2 = (AB)^2 + (BC)^2$



Quadrilateral

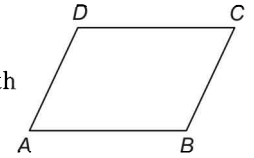
A figure which is formed by joining any four non-collinear points is called quadrilateral. A quadrilateral has four sides, four vertices and four angles.



☞ The sum of all angles of a quadrilateral is 360°.

Types of Quadrilaterals

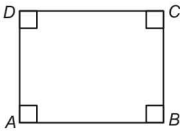
1. **Parallelogram** A quadrilateral is a parallelogram, if its both pairs of opposite sides are parallel.



In the above figure, ABCD is a parallelogram, because AB || DC and AD || BC.

☞ In a parallelogram, opposite sides are equal, opposite angles are equal and diagonals bisect each other.

2. **Rectangle** A parallelogram in which each angle is a right angle and opposite sides are equal, is called rectangle.



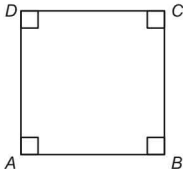
In the above figure, ABCD is a rectangle in which

$AB = CD$ and $AD = BC$

and $\angle A = \angle B = \angle C = \angle D = 90°$

In a rectangle, diagonals bisect each other and they are equal.

3. **Square** Parallelogram having all sides equal and each angle equal to a right angle, is called a square.



In the adjacent figure, ABCD is a square in which

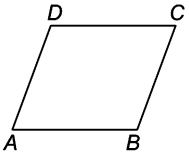
$AB = BC = CD = DA$

and $\angle A = \angle B = \angle C = \angle D = 90°$.

In a square, diagonals bisect each other and they are equal.

4. **Rhombus** A parallelogram in which all the sides are equal is called a rhombus. Sum of adjacent angles of a rhombus is 180°

In the adjacent figure, ABCD is a rhombus in which AB || DC and AD || BC and $AB = BC = CD = DA$.



In rhombus, diagonals bisect each other at 90°, but they are not equal.

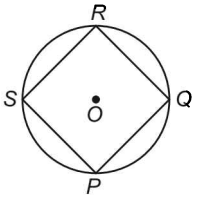
5. **Trapezium** A quadrilateral in which one pair of opposite sides is parallel, is called a trapezium.

Here, in trapezium ABCD, sides AC and BD are parallel to each other.

Cyclic Quadrilateral

A quadrilateral whose vertices are on the circumference of a circle, is called a cyclic quadrilateral.

In the given figure, PQRS is a cyclic quadrilateral.



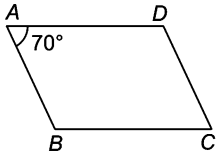
Here, $\angle P + \angle R = 180°$ and $\angle Q + \angle S = 180°$

The opposite angles of a cyclic quadrilateral are supplementary.

Example 5. If *ABCD* is a parallelogram in which $\angle A = 70°$, then find the value of $\angle C$.

(a) 70° (b) 40° (c) 80° (d) 50°

Sol. *(a)* In parallelogram *ABCD*, $AD \parallel BC$



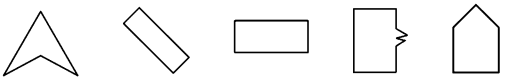
$\therefore \quad \angle C = \angle A$ (opposite angles)

$\therefore \quad \angle C = 70°$

Polygon

A simple closed figure made up of three or more line segments is called a polygon.

Some examples of polygons have been given below



Regular Polygon

If the length of all the sides and all angles are equal, then, it is called regular polygon.

Some important facts related to polygon are as follow

(i) Polygon with three sides is called triangle.
(ii) Polygon with four sides is called quadrilateral.
(iii) Polygon with five sides is called pentagon.
(iv) Polygon with six sides is called hexagon.
(v) Polygon with seven sides is called heptagon.
(vi) Polygon with eight sides is called octagon.
(vii) Polygon with nine sides is called nonagon.
(viii) Polygon with ten sides is called decagon.

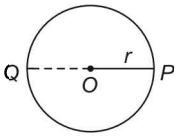
Example 6. Which one of the following statements about the polygon is not true?

(a) The end point of a side is an adjoining vertex
(b) All sides are parallel to each other
(c) The intersection of two sides is a vertex
(d) None of the above

Sol *(b)* It is not true that all sides are parallel to each other.

Circle

A circle is a set of those points in a plane which are at a given constant distance from a fixed point in the plane.



In the above figure, fixed point O is called the centre, constant distance r is called the radius of the circle (OP) and line PQ is a diameter of the circle.

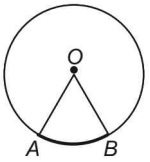
Here, PQ = 2 × Radius = 2 × OP = 2r

Important Terms Related to a Circle

1. **Circumference** The boundary of a circle is called the circumference of the circle.

   ∴ Circumference of circle = $2\pi r$

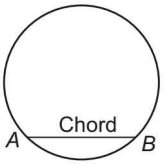
2. **Arc** A continuous part of the boundary of a circle is called an arc of the circle.



   In the above figure, the darken part AB is the arc.

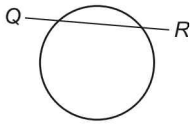
3. **Chord** A line segment joining any two points on the circumference of a circle is called its chord.

   In the above figure, AB is a chord.

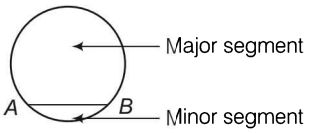


- Equal chords of a circle are equidistant from the centre. Equal chords of a circle subtend equal angle at the centre.
- Diameter is the longest chord in a circle.

4. **Secant** A line which intersects a circle in two distinct part is called a secant of the circle. In the figure, QR is a secant.

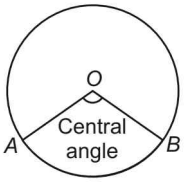


5. **Segment** If AB be a chord of the circle, then AB divides the circular region into two parts, each part is called a segment of the circle.

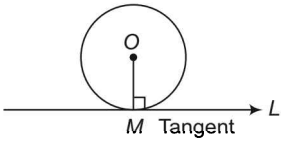


☞ Angles in the same segment of a circle are equal.

6. **Central Angle** The angle subtended at the centre by any two points on the circumference of the circle is called central angle.



7. **Tangent** The tangent of a circle is a straight line which touches the circle at a single point.
   The tangent at any point of a circle is perpendicular to the radius through the point of contact.



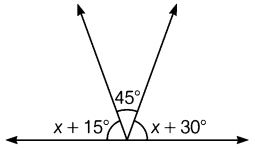
   In the above figure, L is the tangent and M is the point of contact and OM ⊥ ML.

Example 7 The line segment made by joining any two points on the circumference of a circle, is called
(a) diameter
(b) chord
(c) Both (a) and (b)
(d) radius

Sol. *(c)* The line segment made by joining any two points on the circumference of a circle, is called the chord. Also, we know that the longest chord in a circle is the diameter. Hence, both diameter and chord are correct.

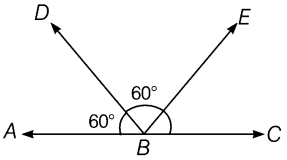
Practice Exercise

1. Find x from the figure.



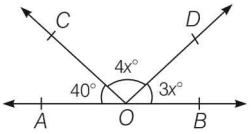
(a) 45° (b) 60°
(c) 30° (d) 90°

2. From the figure, find ∠CBE.



(a) 60° (b) 45° (c) 20° (d) 30°

3. In the given figure, AOB is straight line. If ∠AOC = 40°, ∠COD = 4x° and ∠BOD = 3x°, then ∠COD is equal to



(a) 80° (b) 100° (c) 120° (d) 140°

4. Difference between two complementary angles is 10°. Calculate the values of both angles.
(a) 45°, 45° (b) 40°, 50° (c) 50°, 60° (d) 100°, 10°

5. Difference between two supplementary angles is 20°. Find one angle.
(a) 60° (b) 90° (c) 80° (d) 40°

6. Complementary angle of an angle is five times of it. Find the angle.
(a) 45° (b) 15°
(c) 35° (d) 22°

7. Find the angle which is equal to its complementary angle.
(a) 90° (b) 45° (c) 30° (d) 60°

8. Find the angle which is equal to its supplementary angle.
(a) 180° (b) 45° (c) 90° (d) 60°

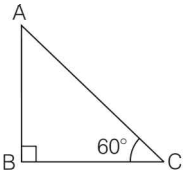
9. If two angles of a triangle are 60° and 50°, respectively. Find the third angle.
(a) 90° (b) 80° (c) 70° (d) 60°

10. An angle of a right angled triangle is 45°. Find the third angle.
(a) 45° (b) 90° (c) 135° (d) 60°

11. In a ΔABC. If ∠A + ∠B = 75° and ∠B + ∠C = 150°. Find ∠B.
(a) 30° (b) 60° (c) 50° (d) 45°

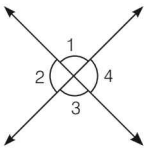
12. The angles of a triangle are in the ratio of 1 : 1 : 4. Find the three angles.
(a) 30°, 30°, 120° (b) 40, 30°, 110°
(c) 130°, 30°, 20° (d) 150°, 15°, 15°

13. From the figure, find ∠A.



(a) 15° (b) 45°
(c) 30° (d) 90°

14. If ∠1 = 135°, ∠4 = 45°. Then, find ∠2 and ∠3, respectively.



(a) 145°, 35° (b) 130°, 50°
(c) 140°, 40° (d) 45°, 135°

15. The angles of a triangle are in the ratio of 2 : 3 : 5. Find the angles.
(a) 45°, 90°, 45° (b) 90°, 45°, 45°
(c) 30°, 96°, 54° (d) 36°, 54°, 90°

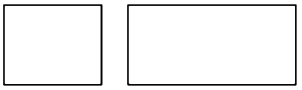
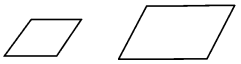
16. If two adjacent angles of a rhombus are in the ratio of 2 : 3, them find the measures of all angles.
(a) 72°, 108°, 72°, 108°
(b) 72°, 108°, 70°, 110°
(c) 80°, 100°, 80°, 100°
(d) None of the above

17. Which of the following measures of three angles can be those of a triangle?
(a) 40°,60°,80° (b) 90°,60°,20°
(c) 100°,80°,50° (d) 40°,80°,90°

18. The measures of the four angles of a quadrilateral are in the ratio of 1 : 2 : 3 : 4. What is the measure of the greatest angle of quadrilateral?
(a) 144° (b) 135° (c) 125° (d) 150°

19. The sum of two opposite angles of a parallelogram is 130°. Find all the angles of parallelogram.
(a) 65°, 65°, 115°, 115°
(b) 145°, 135°, 35°, 45°
(c) 90°, 130°, 80°, 60°
(d) 40°, 140°, 80°, 110°

20. The radius of a circle is 6 cm and the length of one of its chords is 6 cm. Find the distance of the chord from the centre.
(a) 3 cm (b) $3\sqrt{3}$ cm
(c) 10 cm (d) 5 cm

21. Which two quadrilaterals have both 2 right angles and 2 pairs of parallel sides?
(a) 
(b) 
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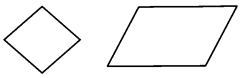
(d) 

22. Which statement is true?
(a) All parallelogram are rectangle because they have 4 sides that are all the same length
(b) All rhombus are squares because they have 2 sets of parallel sides
(c) All nonagons are polygons because they have at least 3 sides.
(d) All hexagons are triangles because they have at least 3 sides.

Answers

1	(a)	2	(a)	3	(a)	4	(b)	5	(c)	6	(b)	7	(b)	8	(c)	9	(c)	10	(a)
11	(d)	12	(a)	13	(c)	14	(d)	15	(d)	16	(a)	17	(a)	18	(a)	19	(a)	20	(b)
21	(a)	22	(c)																

Hints & Solutions

1. $x+15°+45°+x+30°=180°$
[Sum of all angles on a straight line is 180°]
$\Rightarrow \quad 2x+90°=180° \Rightarrow 2x=90° \Rightarrow x=45°$

2. $60°+60°+\angle CBE=180°$
$\Rightarrow \quad 120°+\angle CBE=180° \Rightarrow \angle CBE=180°-120°$
$\therefore \quad \angle CBE=60°$

3. $\because \angle AOC+\angle COD+\angle BOD=180°$
$40°+4x+3x=180°$
$7x=180°-40°$
$7x=140° \Rightarrow x=20°$
$\therefore \quad 4x=4\times 40=80°$

4. Let one angle be x, then the other one will be $(90°-x)$, as the angles are complementary.
According to the question,
$x-(90°-x)=10° \Rightarrow x-90°+x=10°$
$\Rightarrow \quad 2x=10°+90° \Rightarrow 2x=100°$
$\Rightarrow \quad x=\frac{100°}{2}=50°$
$\therefore$ Other angle $=(90°-50°)=40°$

5. Suppose one angle is x, then second angle will be $(180°-x)$, as angles are supplementary.
According to the question,
$x-(180°-x)=20°$
$\Rightarrow \quad x-180°+x=20°$
$\Rightarrow \quad 2x=20°+180°$
$\Rightarrow \quad 2x=200°$
$x=\frac{200°}{2}=100°$
$\therefore \quad$ Other angle $=(180°-100°)=80°$

6. Let the angle be x. Then, its complementary angle will be $(90°-x)$.
According to the question,
$x=\frac{90°-x}{5}$
$\Rightarrow \quad 5x=90°-x$
$\Rightarrow \quad 5x+x=90°$
$\Rightarrow \quad 6x=90°$
$\Rightarrow \quad x=\frac{90°}{6}=15°$

7. Let the angle be x ,then its complementary angle will be $(90° - x)$.
According to the question,

$$x = 90° - x$$

$$\Rightarrow \quad 2x = 90° \Rightarrow x = \frac{90°}{2}$$

$$\Rightarrow \quad x = 45°$$

8. Let the angle be x, then its supplementary angle will be $(180° - x)$.
According to the question,

$$x = 180° - x \quad \Rightarrow \quad x + x = 180°$$

$$\Rightarrow \quad 2x = 180° \quad \Rightarrow \quad x = \frac{180°}{2}$$

$$\therefore \quad x = 90°$$

9. Suppose the third angle is x.
Then, $60° + 50° + x = 180°$
[$\because$ Sum of the angles of a triangle is 180°]

$$\Rightarrow \quad 110° + x = 180° \Rightarrow x = 180° - 110°$$

$$\therefore \quad x = 70°$$

10. Let the third angle be x and as the triangle is right angle, so the second will be of 90°.
So, $45° + 90° + x = 180°$

$$\Rightarrow \quad 135° + x = 180°$$

$$\Rightarrow \quad x = 180° - 135°$$

$$\therefore \quad x = 45°$$

11. $\angle A + \angle B + \angle C = 180°$ [Sum of angles of a triangle is 180°]

$$\Rightarrow \quad \angle A + 150° = 180° \quad [\because \angle B + \angle C = 150°]$$

$$\Rightarrow \quad \angle A = 180° - 150° = 30°$$

$$\Rightarrow \quad \angle A = 30°$$

and $\angle A + \angle B = 75°$ [Given]

$$\Rightarrow \quad 30° + \angle B = 75°$$

$$\Rightarrow \quad \angle B = 75° - 30°$$

$$\Rightarrow \quad \angle B = 45°$$

12. Let one angle be x.

$$x + x + 4x = 180° \quad \text{[Ratio of angles is 1 : 1 : 4]}$$

$$\Rightarrow \quad 6x = 180°$$

$$\Rightarrow \quad x = 30°$$

So, angle will be 30°, 30° and $4 \times 30° = 120°$.

13. $\angle A + \angle B + \angle C = 180°$

$$\Rightarrow \quad \angle A + 90° + 60° = 180° \quad [\because \angle B = 90°]$$

$$\Rightarrow \quad \angle A = 180° - 90° - 60°$$

$$\Rightarrow \quad \angle A = 180° - 150°$$

$$\therefore \quad \angle A = 30°$$

14. $\angle 3 = \angle 1$ [Vertically opposite angles]

$$\therefore \quad \angle 3 = 135° \quad [\because \angle 1 = 135°]$$

$\angle 2 = \angle 4$ [Vertically opposite angles]

$$\therefore \quad \angle 2 = 45° \quad [\because \angle 4 = 45°]$$

15. $2x + 3x + 5x = 180°$ [Ratio of angles is 2 : 3 : 5]

$$10x = 180°$$

$$x = \frac{180°}{10} \Rightarrow x = 18°$$

So, angles will be $2x = 2 \times 18° = 36°$,

$3x = 3 \times 18° = 54°$,

$5x = 5 \times 18° = 90°$

16. Let ABCD be a rhombus, then

$$\angle A : \angle B = 2 : 3$$

Since, the adjacent angles of a rhombus are supplementary.

$$\therefore \quad 2x° + 3x° = 180° \Rightarrow 5x° = 180° \Rightarrow x° = 36°$$

$$\therefore \quad \angle A = 72° \text{ and } \angle B = 108°$$

Since, the opposite angles of a rhombus are equal.

$$\therefore \quad \angle C = \angle A = 72° \text{ and } \angle B = \angle D = 108°$$

17. Sum of all the angles of a triangle is 180°.
Here, $40° + 60° + 80° = 180°$
Hence, 40°, 60° and 80° can be the angles of a triangle.

18. Let the angles are x, 2x, 3x and 4x.

$$\because \quad x + 2x + 3x + 4x = 360°$$

$$\Rightarrow \quad 10x = 360° \Rightarrow x = 36°$$

$$\therefore \quad \text{Greatest angle} = 4 \times 36° = 144°$$

19. $\because \angle A + \angle C = 130°$, then

$$\therefore \quad \angle A = \angle C = \frac{130°}{2} = 65°$$

($\because$ opposite angles are equal)

and $\angle B + \angle D = 360° - 130° = 230°$

$$\therefore \quad \angle B = \angle D = \frac{230°}{2} = 115°$$

($\because$ opposite angles are equal)

Hence, all the angles are 65°, 65°, 115° and 115°.

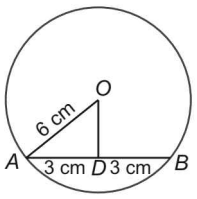
20. Let AB be a chord of a circle with centre O and radius 6 cm such that AB = 6 cm.
From the point O, draw $OD \perp AB$. Now, join OA
Clearly, $AD = \frac{1}{2}(AB) = 3$ cm and $OA = 6$ cm
Now, in right angled ΔODA,

$$OD = \sqrt{OA^2 - AD^2}$$

(using Pythagoras theorem)

$$= \sqrt{6^2 - 3^2} = \sqrt{27} = 3\sqrt{3} \text{ cm}$$

Hence, the distance of the chord from the centre is $3\sqrt{3}$ cm.



21. Square and rectangle both have 2 right angles and 2 pairs of parallel sides.

22. Option (c) is true. All nonagons (9 sides) are polygons because they have atleast 3 sides.

Try Yourself

1) Two angles of a triangle are 50°, 50°. Find the third angle of the triangle.
(a) 90° (b) 45° (c) 80° (d) 60°

2) Difference between two complementary angles is 60°. Find each angle.
(a) 90°, 25° (b) 60°, 45° (c) 70°, 20° (d) 75°, 15°

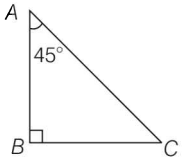
3) Difference between two supplementary angles is 80°. Find each angle.
(a) 55°, 125° (b) 60°, 120°
(c) 50°, 130° (d) 135°, 45°

4) One angle of a right angled triangle is 60°. Find the third angle.
(a) 35° (b) 40° (c) 25° (d) 30°

5) *A* quadrilateral *ABCD* is inscribed in a circle. If *AB* is parallel to *CD* and *AC* = *BD*, then the quadrilateral must be a
(a) parallelogram (b) rhombus
(c) trapezium (d) None of these

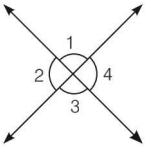
6) The length of the chord of a circle is 8 cm and perpendicular distance between centre and the chord is 3 cm. Then, the radius of the circle is equal to
(a) 4 cm (b) 5 cm (c) 6 cm (d) 8 cm

7) Find $\angle ACB$ from the given figure.



(a) 25° (b) 45° (c) 30° (d) 75°

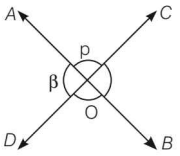
8) If in figure, $\angle 1 = 50°$ and $\angle 4 = 40°$. Find $\angle 2$ and $\angle 3$.



(a) 40°, 50°
(b) 45°, 30°
(c) 30°, 25°
(d) 90°, 75°

9) If *ABCD* is a cyclic quadrilateral with $\angle A = 50°$, $\angle B = 80°$, then $\angle C$ and $\angle D$ are
(a) 130°, 100°
(b) 115°, 115°
(c) 110°, 120°
(d) 130°, 120°

10) In the given figure, straight lines *AB* and *CD* intersect at *O*. If $\angle\beta = 3\angle p$, then $\angle p$ is equal to



(a) 40° (b) 45°
(c) 50° (d) 55°

Answers

1	(c)	2	(d)	3	(c)	4	(d)	5	(c)
6	(b)	7	(b)	8	(a)	9	(a)	10	(b)