SETH M. R. JAIPURIA SCHOOLS BANARAS PARAO CAMPUS

Subject –
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M.M. –

Name - _____Roll No- ___Section- ___I.Sign._____

1. Introduction to Euclid's Geometry

- Euclid's Postulate 1: A straight line may be drawn from any one point to any other point.
- Euclid's Postulate 2: A terminated line can be produced indefinitely.
- Euclid's Postulate 3: A circle can be drawn with any centre and any radius.
- Euclid's Postulate 4: All right angles are equal to one another.
- Euclid's Postulate 5: If a straight line falling on two straight lines makes the interior angles on the same side of it taken together less than two right angles, then the two straight lines, if produced indefinitely, meet on that side on which the sum of angles is less than two right angles.

2. Lines and Angles

- Axiom (Linear Pair): If a ray stands on a line, then the sum of two adjacent angles so formed is 180°.
- Axiom (Converse of Linear Pair): If the sum of two adjacent angles is 180°, then the non-common arms of the angles form a line.
- Theorem: If two lines intersect each other, then the vertically opposite angles are equal.
- Theorem: If a transversal intersects two parallel lines, then each pair of alternate interior angles is equal.
- Theorem: If a transversal intersects two lines such that a pair of alternate interior angles is equal, then the two lines are parallel.
- Theorem: Lines which are parallel to the same line are parallel to each other.
- Theorem (Angle Sum Property): The sum of the angles of a triangle is 180°.
- Theorem (Exterior Angle): If a side of a triangle is produced, then the exterior angle so formed is equal to the sum of the two interior opposite angles.

3. Triangles

- SAS Congruence Rule (Axiom): Two triangles are congruent if two sides and the included angle of one triangle are equal to the two sides and the included angle of the other triangle.
- ASA Congruence Rule (Theorem): Two triangles are congruent if two angles and the included side of one triangle are equal to two angles and the included side of other triangle.
- AAS Congruence Rule: Two triangles are congruent if any two pairs of angles and one pair of corresponding sides are equal.
- SSS Congruence Rule: If three sides of one triangle are equal to the three sides of another triangle, then the two triangles are congruent.
- RHS Congruence Rule: If in two right triangles the hypotenuse and one side of one triangle are equal to the hypotenuse and one side of the other triangle, then the two triangles are congruent.
- Theorem: Angles opposite to equal sides of an isosceles triangle are equal.
- Theorem: The sides opposite to equal angles of a triangle are equal.

4. Quadrilaterals

- Theorem: A diagonal of a parallelogram divides it into two congruent triangles.
- Theorem: In a parallelogram, opposite sides are equal.
- Theorem: In a parallelogram, opposite angles are equal.
- Theorem: The diagonals of a parallelogram bisect each other.
- Theorem: A quadrilateral is a parallelogram if a pair of opposite sides is equal and parallel.
- Mid-Point Theorem: The line segment joining the mid-points of two sides of a triangle is parallel to the third side and is half of it.
- Converse of Mid-Point Theorem: The line drawn through the mid-point of one side of a triangle, parallel to another side, bisects the third side.

5. Circles

- Theorem: Equal chords of a circle subtend equal angles at the centre.
- Theorem: The perpendicular from the centre of a circle to a chord bisects the chord.
- Theorem: There is one and only one circle passing through three given non-collinear points.
- Theorem: Equal chords of a circle (or of congruent circles) are equidistant from the centre (or centres).
- Theorem: The angle subtended by an arc at the centre is double the angle subtended by it at any point on the remaining part of the circle.
- Theorem: Angles in the same segment of a circle are equal.
- Theorem: The sum of either pair of opposite angles of a cyclic quadrilateral is 180°.

TEST

1. If $x = \frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}-\sqrt{2}}$ and $y = \frac{\sqrt{3}-\sqrt{2}}{\sqrt{3}+\sqrt{2}}$, find the value of $x^2 + y^2$.

   (a) 98 (b) 100 (c) 102 (d) 96

2. The value of $(256)^{0.16} \times (256)^{0.09}$ is:

   (a) 4 (b) 16 (c) 64 (d) 256.25

3. If $x + y + z = 0$, then the value of $\frac{x^2}{yz} + \frac{y^2}{zx} + \frac{z^2}{xy}$ is:

   (a) 0 (b) 1 (c) 3 (d) -1

4. The polynomial $p(x) = kx^3 + 9x^2 + 4x - 8$ when divided by $(x + 3)$ leaves a remainder $10(1 - k)$. The value of k is:

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

5. Points $A(5,3), B(-2,3)$, and $D(5,-4)$ are three vertices of a square $ABCD$. The coordinates of the vertex C are:

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

6. The graph of the linear equation $2x + 3y = 6$ cuts the y-axis at the point:

   (a) $(2,0)$ (b) $(0,3)$ (c) $(3,0)$ (d) $(0,2)$

7. Which of the following needs a proof?

   (a) Axiom (b) Definition (c) Postulate d) Theorem

8. In $\triangle ABC$, the bisectors of $\angle ABC$ and $\angle BCA$ intersect each other at O. If $\angle BAC = 50°$, then $\angle BOC$ is:

   (a) $100°$ (b) $115°$ (c) $120°$ (d) $125°$

9. If the angles of a triangle are in the ratio $5:3:7$, the triangle is:

   (a) An acute angled triangle (b) An obtuse angled triangle

   (c) A right angled triangle (d) An isosceles triangle

10. In a right angled triangle, if one acute angle is double the other, then the hypotenuse is:

    (a) Equal to the smallest side (b) Double the smallest side
    (c) Triple the smallest side (d) $\sqrt{2}$ times the smallest side

11. In quadrilateral $ABCD, AB \| DC$ and $AD = BC$. Then $\angle A + \angle C$ is equal to:

    (a) $180°$ (b) $90°$ (c) $270°$ (d) $360°$

12. D, E, and F are the mid-points of the sides BC, CA, and AB respectively of $\triangle ABC$. If the perimeter of $\triangle ABC$ is 12.8 cm, then the perimeter of $\triangle DEF$ is:

    (a) 12.8 cm (b) 3.2 cm (c) 6.4 cm (d) 25.6 cm

13. AD is a diameter of a circle and AB is a chord. If $AD = 34$ cm, $AB = 30$ cm, the distance of AB from the centre of the circle is:

    (a) 17 cm (b) 15 cm (c) 4 cm (d) 8 cm

14. The sides of a triangle are 35 cm, 54 cm, and 61 cm. The length of its longest altitude is:

    (a) $16\sqrt{5}$ cm (b) $10\sqrt{5}$ cm (c) $24\sqrt{5}$ cm (d) 28 cm

15. A cone, a hemisphere, and a cylinder stand on equal bases and have the same height. The ratio of their volumes is:

    (a) $3:2:1$ (b) $1:2:3$ (c) $2:1:3$ (d) $1:3:2$

16. The curved surface area of a right circular cylinder of height 14 cm is 88 cm^2. The diameter of the base of the cylinder is:

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

17. The mean of 5 numbers is 30. If one number is excluded, their mean becomes 28. The excluded number is:

    (a) 28 (b) 30 (c) 35 (d) 38

18. In a frequency distribution, the mid-value of a class is 10 and the width of the class is 6. The lower limit of the class is:

    (a) 6 (b) 7 (c) 8 (d) 12

Answer Key:

1. (a) 98
2. (a) 4
3. (c) 3
4. (c) 3
5. (a) $(-2, -4)$
6. (d) (0,2)
7. (d) Theorem
8. (b) 115°
9. (a) An acute angled triangle
10. (b) Double the smallest side
11. (a) 180°
12. (c) 6.4 cm
13. (d) 8 cm
14. (c) $24\sqrt{5}$ cm
15. (b) 1: 2: 3
16. (b) 2 cm
17. (d) 38
18. (b) 7