## BLUE PRINT: CLASS IX

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**Note:** * - Internal Choice Questions
SECTION – A
Questions 1 to 6 carry 1 mark each.

1. Two angles measures $x - 60^\circ$ and $123^\circ - 2x$. If each one is opposite to equal sides of an isosceles triangle, then find the value of $x$.

2. If the point $(3, 4)$ lies on the graph of the equation $3y = ax + 7$, find the value of $a$.

3. Simplify: $\frac{\sqrt{32} + \sqrt{48}}{\sqrt{8} + \sqrt{12}}$

OR

Simplify: $\sqrt{72} + \sqrt{800} - \sqrt{18}$

4. If its perimeter of an equilateral triangle is 180 cm, what will be its area?

5. For what value of $m$ is $x^3 - 2mx^2 + 16$ divisible by $x + 2$?

OR

If $-1$ is a zero of the polynomial $p(x) = ax^3 - x^2 + x + 4$, then find the value of ‘$a$’. 

6. In the below figure, $\angle ABC = 69^\circ$, $\angle ACB = 31^\circ$, find $\angle BDC$.

SECTION – B
Questions 6 to 12 carry 2 marks each.

7. Find the value of $x^3 + y^3 + 15xy - 125$ if $x + y = 5$. 
8. Prove that if one angle of a triangle is equal to the sum of the other two angles, then the triangle is right angled.

   OR
   Two angles of triangle are equal and the third angle is greater than each of these angles by 30°. Find all the angles of the triangle.

9. Show that 1.272727… can be expressed in the form of \( \frac{p}{q} \), where \( p \) and \( q \) are integers and \( q \neq 0 \).

10. The angles of quadrilateral are in the ratio 3 : 5 : 9 : 13. Find all the angles of the quadrilateral.

11. Find the area of a triangle two sides of which are 18cm and 10cm and the perimeter is 42cm.

   OR
   If the base of a right-angled triangle is 15 cm and its hypotenuse is 25 cm, then find its area.

12. In the below figure, ABCD is a parallelogram, AE \( \perp \) DC and CF \( \perp \) AD. If AB = 16 cm, AE = 8 cm and CF = 10 cm, find AD.

13. In the below figure, ABCD is a quadrilateral and BE \parallel AC and also BE meets DC produced at E. Show that area of \( \Delta ADE \) is equal to the area of the quadrilateral ABCD.

   OR
   Show that a median of a triangle divides it into two triangles of equal areas.

14. If a point C lies between two points A and B such that AC = BC, then prove that AC = \( \frac{1}{2} \) AB. Explain by drawing the figure.

15. Solve the equation 2x + 1 = x – 3, and represent the solution(s) on (i) the number line, (ii) the Cartesian plane.

16. A chord of a circle is equal to the radius of the circle. Find the angle subtended by the chord at a point on the minor arc and also at a point on the major arc.

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Prepared by: M. S. KumarSwamy, TGT(Maths)
17. AB is a line-segment. P and Q are points on opposite sides of AB such that each of them is equidistant from the points A and B (see below left figure). Show that the line PQ is the perpendicular bisector of AB.

OR

ABCD is a quadrilateral in which AD = BC and \( \angle DAB = \angle CBA \) (see the above right sided figure). Prove that (i) \( \triangle ABD \cong \triangle BAC \) (ii) BD = AC (iii) \( \angle ABD = \angle BAC \).

18. Construct the angle 75° and verify by measuring them by a protractor.

19. Factorise \( x^3 - 23x^2 + 142x - 120 \).

20. A floral design on a floor is made up of 16 tiles which are triangular, the sides of the triangle being 9 cm, 28 cm and 35 cm. Find the cost of polishing the tiles at the rate of 50p per cm\(^2\).

21. In the below left figure, if AB \parallel CD, CD \parallel EF and \( y : z = 3 : 7 \), find x.

OR

In the above right sided figure, if AB \parallel CD, EF \perp CD and GED = 126°, find \( \angle AGE \), \( \angle GEF \) and \( \angle FGE \).

22. Find the value of a and b in \( \frac{5 + 2\sqrt{3}}{7 + 4\sqrt{3}} = a + b\sqrt{3} \)

OR

Simplify \( \frac{\sqrt{3} - \sqrt{2}}{\sqrt{3} + \sqrt{2}} + \frac{\sqrt{3} + \sqrt{2}}{\sqrt{3} - \sqrt{2}} \) by rationalizing the denominator.
SECTION – D
Questions 23 to 30 carry 4 marks each.

23. Prove that "The sum of either pair of opposite angles of a cyclic quadrilateral is 180°."

OR

Prove that "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."

24. Find the value of \( \frac{4}{(216)^{\frac{3}{2}}} + \frac{1}{(256)^{\frac{3}{4}}} + \frac{2}{(243)^{\frac{1}{5}}} \)

25. If each side of a triangle is doubled, then find the ratio of area of the new triangle thus formed and the given triangle.

OR

A field is in the shape of a trapezium whose parallel sides are 25 m and 10 m. The non-parallel sides are 14 m and 13 m. Find the area of the field.

26. Construct a triangle XYZ in which \( \angle Y = 30°, \angle Z = 90° \) and \( XY + YZ + ZX = 11 \) cm.

27. Show that if the diagonals of a quadrilateral bisect each other at right angles, then it is a rhombus.

28. Plot the points A (4, 4) and (–4, 4) on a graph sheet. Join the lines OA, OB and BA. What figure do you obtain.

29. The taxi fare in a city is as follows: For the first kilometre, the fare is Rs 8 and for the subsequent distance it is Rs 5 per km. Taking the distance covered as \( x \) km and total fare as Rs \( y \), write a linear equation for this information, and draw its graph.

30. If \( x^3 + ax^2 + bx + 6 \) has \( (x – 2) \) as a factor and leaves a remainder 3 when divided by \( (x – 3) \), find the values of \( a \) and \( b \).

OR

Without actual division, prove that \( 2x^4 – 6x^3 + 3x^2 + 3x – 2 \) is exactly divisible by \( x^2 – 3x + 2 \).