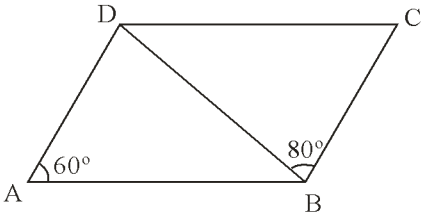
Mathematics
Full Syllabus Test

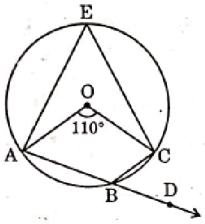
IX (CBSE) **Full Marks : 80** **Time : 3 hrs.**

SECTION – A
(6 × 1)

1. If $a + b + c = 0$, then find value of $\frac{a+b}{c}+\frac{b+c}{a}+\frac{c+a}{b}$.
2. If $(x - 3)$ is a factor of the polynomial $p^2x^3 - px^2 + 3px - p$, find p.
3. One angle of a quadrilateral is 140^o and other three angles are in the ratio 3 : 3 : 2. Find the measure of the smallest angle of the quadrilateral.
4. In the adjoining figure, ABCD is a parallelogram if $\angle DAB = 60^o$ and $\angle DBC = 80^o$, then find $\angle CDB$.



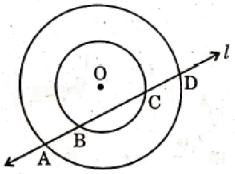
5. In the given figure, O is the centre, then find the value of $\angle CBD$.



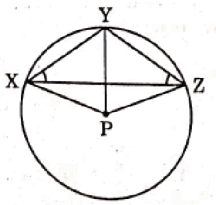
6. A chord of a circle of radius 7.5 cm with centre O is of length 9 cm. Find its distance from the centre.

SECTION – B
(6 × 2)

7. If $x^2+\frac{1}{x^2}=6$, then find value of $x^3-\frac{1}{x^3}$.
8. For what value of a, $x - 5$ exactly divide the polynomial $x^3 - 3x^2 - 8x + a$?
9. Two concentric circles with centre O have A, B, C and D as points of intersection with a line l as shown in the figure. If AD = 12 cm and BC = 8 cm, then find the length of AB and CD.



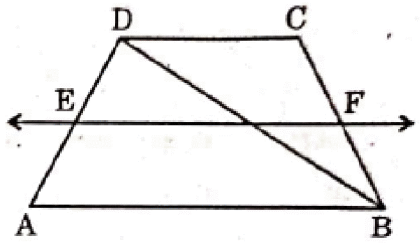
10. In the figure, P is the centre of the circle. Prove that $\angle XPZ = 2(\angle XZY + \angle YXZ)$.



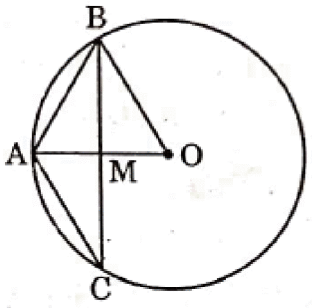
11. What should be the length of the third side of an isosceles triangle, if the length of the other two sides are 5 cm and 11 cm. Justify your answer.
12. The probability of guessing the correct answer to a certain question is x / 5. If the probability of not guessing the correct answer is 2x / 3, then find the value of x.

SECTION – C
(10 × 3)

13. Give possible length, breadth and height of a cuboid of volume $(125x^4 - 64y^3x)$.
14. Without actually calculating the cubes, evaluate $(25)^3 + (-19)^3 - (6)^3$.
15. ABCD is a trapezium in which AB || DC, BD is a diagonal and E is the mid-point of AD. A line is drawn through E parallel to AB intersecting BC at F (see fig.). Show that F is the mid-point of BC.



16. Prove that the quadrilateral formed by the mid-points of the sides of a square is also a square.
17. In a circle of radius 5 cm, AB and AC are two chords such that AB = AC = 6 cm, as shown in the figure. Find the length of the chord BC.



18. If the non-parallel sides of a trapezium are equal, then prove that it is cyclic.
19. If the radius of a sphere is doubled, then find the percentage increase in its volume.
20. How many meter of 5 meter wide cloth will be required to make a conical tent, the radius of whose base is 3.5 m and height is 12 m?
21. A die is thrown 1000 times with the following frequencies for the outcomes 1, 2, 3, 4, 5 and 6 as given below:

Outcomes	1	2	3	4	5	6
Frequency	175	125	250	150	100	200

Find the probability of getting 2, getting 4 and getting 6.

22. The table shows the marks obtained by a student in unit test out of 50:

Unit Test	I	II	III	IV	V
Marks (out of 50)	34	35	36	34	37

Find the probability that the student get 70% or more in the next unit test. Also the probability that student get less than 70%.

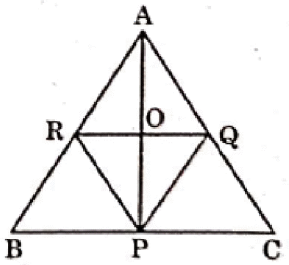
SECTION – D

(8 × 4)

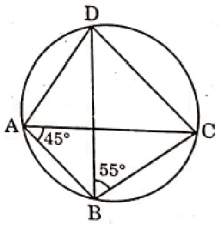
23. If a + b + c = 0, find the value of $(-2a)^3 + (-2b)^3 + (-2c)^3 - 3(-2a)(-2b)(-2c)$.

24. Factorise: $2x^3 - x^2 - 13x - 6$.

25. In the figure, ΔABC is an isosceles triangle in which AB = AC. P, Q and R are the mid-points of sides BC, AC and AB respectively. Show that $AP \perp RQ$ and AP is bisected by RQ.



26. Prove that the angle subtended by an arc at the centre is double the angle subtended by it any point on the remaining part of the circle. Using this in the given figure, find $\angle BCD$ if ABCD is a cyclic quadrilateral in which AC and BD are the diagonals, if $\angle DBC = 55^\circ$ and $\angle BAC = 45^\circ$.



27. Bisectors of angles A, B and C of a triangle ABC intersect its circumcircle at D, E and F respectively. Prove that the angles of ΔDEF are $90^\circ - \frac{A}{2}, 90^\circ - \frac{B}{2}, 90^\circ - \frac{C}{2}$.

28. Construct ΔPQR, given that QR = 3 cm, $\angle PQR = 45^\circ$ and QP – PR = 2 cm.

29. A hemispherical bowl of internal and external diameters 6 cm and 10 cm is melted and formed into a right circular cylinder of radius 14 cm. Find the height of the cylinder.

30. Rain water falls on a flat rectangular surface of length 6 m and breadth 4 m is transferred into a cylindrical vessel of internal radius 20 cm. What will be the height of the water in the cylindrical vessel of the rainfall in 1 cm. Give your answer to the nearest whole number $(\pi = 3.14)$.