Sample Paper (Session 2017-18)

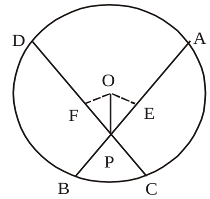
Class: IX | **Subject: Mathematics**
Time: 3Hr | **M.M:80**

Section A — 1 x 6 = 6

1. How many rational numbers can be inserted between 2 and 3?
2. State true or false: $\sqrt{8} + \sqrt{32} - \sqrt{2} = 5\sqrt{2}$
3. Which of these two points (0, -5) and (-5,0) lies on x axis?
4. Simplify: $\sqrt{2a^2 + 2\sqrt{6ab} + 3b^2}$
5. Find the length of each side of an equilateral triangle having an area $9\sqrt{3}$ cm^2.
6. Express 34/9 in the decimal form.

Section B — 2 x 6 = 12

7. Find the probability of getting an ace from a well shuffled pack of 52 cards.
8. Plot the points A(-4,0) & B(3,0) on the cartesian plane and hence find:
   (i) Distance of A from origin (ii) Distance between points A and B.
9. Prove that every line segment has one and only one midpoint .Give Euclid's axiom which is used.
10. In figure O is the centre of a circle and PO bisects Δ APD. Prove that AB = CD



11. ABCD is a parallelogram, if the two diagonals are equal, find the measure of $\angle$ABC
12. An isosceles right triangle has area 8 cm^2. Find the length of its hypotenuse.

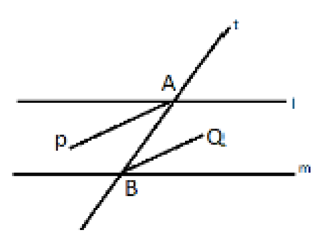
Section – C — 3 x 10 = 30

13. Two dice are thrown simultaneously 500 times. Each time the sum of the two numbers appearing on their tops is noted and recorded as given in the following table:

x	2	3	4	5	6	7	8	9	10	11	12
f	14	30	42	55	72	75	70	53	46	28	15

If the dice is thrown once more, what is the probability of getting a sum (i) 3 (ii)more than 10 (iii)less than or equal to 5

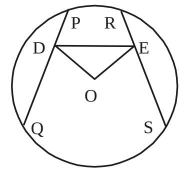
14. Factorise: $x^3 - 3x^2 - 9x - 5$
15. Find the coordinates of the point:
    i) which lies on x and y axes both?
    ii) whose ordinate is -4 and which lies on y-axis.
    iii) whose abscissa is 5 and which lies on x-axis.
16. Does Euclid's fifth postulate imply the existence of parallel lines? Explain.
17. AP and BQ are bisectors of the two alternate interior angles formed by the intersection of a transversal t with parallel lines l and m. Show that AP$\parallel$BQ.



Or

Water flows in a tank 150 m × 100 m at the base, through a pipe whose cross section is 2 dm by 1.5 dm at the speed of 15 km per hour. In what time, will the water be 3 metres deep.

18. In the adjoining figure, O is the centre of the circle and PQ, RS are its equal chords, OD $\perp$ PQ and OE $\perp$ RS. If Δ DOE = 130°, then Δ PDE is–.



19. If $a = 7 - 4\sqrt{3}$, find the value of $\sqrt{a} + \frac{1}{\sqrt{a}}$
20. If a + b + c =14, $a^2 + b^2 + c^2 = 74$ and $a^3 + b^3 + c^3 = 434$, find the value of abc.

Or

If p + q + r = 0, then prove that : $\frac{p^2}{qr} + \frac{q^2}{pr} + \frac{r^2}{pq} = 3$

21. Plot the points whose vertices are the point (-1 , 1), (-3 , 2) and (-1 , 2) in a certain plane. Name the figure so obtained & find its area.
22. Prove that "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."

Or

ABC is an isosceles triangle with AB = AC and BD, CE are its two median. Show that BD = CE.

Section D 4 x 8 = 32

23. If $\frac{2}{\sqrt{3}+\sqrt{5}} + \frac{5}{\sqrt{3}-\sqrt{5}} = \sqrt{3} + b\sqrt{5}$, find a and b.
24. Prove that $(a + b)^3 + (b + c)^3 + (c + a)^3 - 3(a+b)(b+c)(c + a) = 2(a^3 + b^3 + c^3 - 3abc)$
25. In a circle of radius 5 cm, AB and AC are two chords such that AB = AC = 6 cm. Find the length of the chord BC.
26. Δ ABC is an isosceles triangle in which AB = AC. Side BA is produced to D such that AD = AB. Show that $\angle BCD$ is a right angle.
27. A rhombus shaped field has green grass for 18 cows to gaze. If each side of the rhombus is 30m and its longer diagonal is 48m, how much area of grass field will each cow be getting?

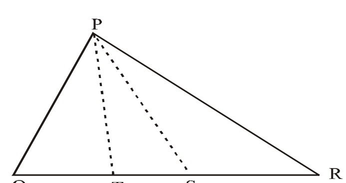
Or

Find the area of a quadrilateral ABCD, where AB=7cm, DA=15cm, AC=9cm, BC=6cm and CD=12cm.

28. Bisectors of interior ∠B and exterior ∠ACD of a ΔABC intersect at a point T. Prove that $\angle BTC = \frac{1}{2}\angle BAC$.

Or

In the Fig. PS is the bisector of the ∠P and PT ⊥ QR, then show that $\angle TPS = \frac{1}{2}(\angle Q - \angle R)$



29. Show that the difference of any two sides of a triangle is less than the third side.

Or

Construct a triangle PQR whose perimeter is equal to 14 cm, $\angle P = 45^\circ$ and $\angle Q = 60^\circ$.

30. If h, C, V are respectively the height , the curved surface and the volume of a cone, prove that $3\pi Vh^3 - C^2h^2 + 9V^2 = 0$

Or

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 $90^\circ - \frac{A}{2}$, $90^\circ - \frac{B}{2}$ and $90^\circ - \frac{C}{2}$.