Deeksha

Sample Paper 3

[*Time Allowed*: 3 *Hours*] [*Maximum Marks*: 80]

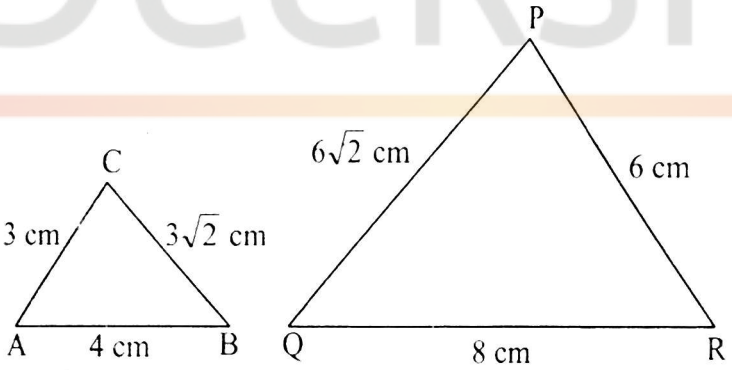
General Instructions

(i) *All questions are compulsory:*
(ii) *The question paper consists of 30 questions divided into four sections –A, B, C and'D.*
(iii) *Section A contains 6 questions of A 1 mark each. Section B contains 6 questions of 2 marks each, Section C contains 10 questions of 3 marks each and Section D contains 8 questions of 4 marks each.*
(iv) *There is no overall choice.*
(v) *Use of calculators is not permitted.*

Section ' A'

Question numbers 1 to 6 cany 1 mark each.

1. Express sec 50° + cot 78° in terms of t-ratios of angles between 0° and 45°.
2. Observe the given figures of ΔABC and ΔPQR. Then find whether they are similar or not.



3. Find a quadratic polynomial, the sum and product of whose zeroes are – 7 and – 18 respectively.
4. Find the value of k for which the equation $kx^2 + 2x + 1 = 0$ has real and distinct roots.
5. The first three terms of an A.P. respectively are $3y - 1$, $3y + 5$ and $5y + 1$. Find the value of y.

6. Volume and surface area of a solid hemisphere are numerically equal. What is the diameter of hemisphere ?

Section 'B'

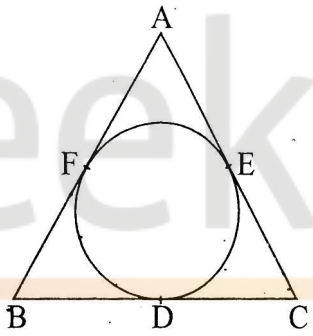
Question numbers 7 to 12 carry 2 marks each.

7. Prove that the tangents at the extermities of any chord make equal angles with the chord.

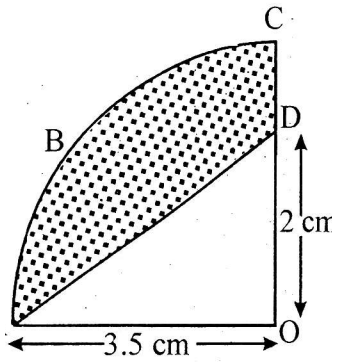
8. A card is drawn at random from a well-shuffled pack of 52 cards. Find the probability that the card drawn is neither a red card nor a queen.

9. Express 3825 as the product of prime factors.

10. The incircle of ΔABC touches the sides BC, CA and AB at D, E and F respectively. If $AB = AC$, prove that $BD = CD$.



11. In figure, $OABC$ is a quadrant, of a circle with centre O and radius 3.5 cm. If $OD = 2$ cm, find the area of the shaded region. $\left[\text{Use } \pi \ \frac{22}{7}\right]$



12. The length of 42 leaves of a plant are measured correct up to the nearest millimetre and the data is as under:

Length (in mm)	118 – 126	126 – 134	134 – 142	142 – 150	150 – 158	158 – 166
Number of leaves	4	5	10	14	4	5

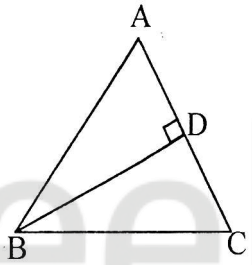
Find the mode length of the leaves.

Section 'C'

Question numbers 13 to 22 carry 3 marks each.

13. In an isosceles triangle ABC with $AB = AC$, BD is perpendicular from B to the side AC. Prove that

$$BD^2 - CD^2 = 2CD \cdot AD.$$



14. Draw a pair of tangents to a circle of radius 5 cm which are inclined to each other at an angle of 60°.

15. Prove that: $\frac{\sin A}{\sec A + \tan A - 1} + \frac{\cos A}{\text{cosec } A + \cot A - 1} = 1$

16. The weekly pocket money of the students of Class X of a school is given in the following table :

Pocket money (in)	0 – 40	40 – 80	80 – 120	120 – 160	160 – 200	200 – 240
Number of students	5	7	15	10	5	8

Find the median for the above data.

17. Solve the following equation for x:

$$9x^2 - 9(p + q)x + (2p^2 + 5pq + 2q^2) = 0$$

18. Find the. area of the quadrilateral $ABCD$ whose vertices are $A(1, 0)$, $B(5, 3)$, $C(2, 7)$ and $D(-2, 4)$.

19. Find the area of a triangle having vertices as $X(4, -3)$, $Y(-6, -3)$ and $Z(0, -3)$. Justify your answer.

20. A cylindrical tank has a capacity of 6160 cu. m. Find its depth, if its radius is 14 m. Calculate the cost of painting its curved surface (outer) at the rate of ₹ 3/m^2.

21. Find all the zeroes of the polynomial $2x^4 - 11x^3 + 7x^2 + 13x - 7$, it being given that two of its zeroes are $(3+\sqrt{2})$ and $(3-\sqrt{2})$.

22. Determine the A.P. whose fourth term is 18 and the difference of the ninth term from the fifteenth term is 30.

Section 'D'

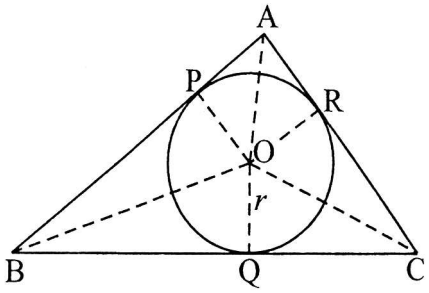
Question numbers 23 to 30 carry 4 marks each.

23. Anil takes 6 days less than the time taken by Varun to finish a piece of work. If both Anil and Varun together can finish that work in 4 days, find the time taken by Varun to finish the work independently.

24. Solve for x :

$$2\left(\frac{2x-1}{x+3}\right) - 3\left(\frac{x+3}{2x-1}\right) = 5; \text{ given that } x \neq -3, x \neq \frac{1}{2}$$

25. In figure, the sides AB, BC and CA of triangle ABC touch a circle with centre O and radius r at P. Q and R respectively.



Prove that:

(*i*) $AB + CQ = AC + BQ$

(*ii*) Area (ΔABQ = $\frac{1}{2}$ (Perimeter of ΔABC) × r

26. Two poles of equal heights are standing opposite to each other on either side of the road which is 80 m wide. From a point P between them on the road, the

angle of elevation of the top of a pole is 60° ind the angle of depression from the top of another pole at point P is 30°. Find the heights of the poles nd the distances of the point P from the poles.

27. Water is flowing at the rate of 2.52 km/h through a cylindrical pipe into a cylindrical lank, the radius of whose base is 40 cm. If the increase in the level of water in the tank, in half an hour is 3.15 m, find the internal diameter of the pipe.

28. If A, B, C are interior angles of ΔABC, show that:

$$\text{cosec}^2\left(\frac{B+C}{2}\right) - \tan^2\frac{A}{2} = 1$$

29. A box contains 150 mangoes of which 90 are good, 45 have minor defects and 15 are rotten.. What is the probability of not getting a single rotten mango in the box ? If 10 boxes are purchased, how many rotten mangoes are expected ?

30. Show that'an even integer is of the form 6q or 6q + 2 or 6q + 4, where q is a positive integer.

ANSWERS

Section 'A'

1. $\operatorname{cosec} 40° + \tan 12°$
2. $\Delta ABC \sim \Delta RQP$
3. $k[(x+9)(x-2)]$, where k is any non-zero constant
4. All real values of $k < 1$
5. $y = 5$
6. 9 units

Section 'B'

8. $\frac{6}{13}$
9. $3825 = 3^2 \times 5^2 \times 17$
11. 6.125 cm^2
12. Mode = 144.29 mm

Section 'C'

16. Median = 114.67
17. $\frac{2p+q}{3}$ and $\frac{p+2q}{3}$
18. 25 sq. units
19. Area of $\Delta XYZ = 0$
20. Depth = 10 m, Cost of painting = ₹ 2,640
21. All zeroes are $3+\sqrt{2}, 3-\sqrt{2}, \frac{1}{2}$ and -1
22. 3, 8, 11, 16,...

Section 'D'

23. 12 days
24. $x = -10$ and $x = -\frac{1}{5}$
26. Height of each pole is 34.64 m and the distance of the point P from pole AB is 20 m and from the pole CD is = 80 m – 20 m = 60 m.
27. Internal diameter of cylindrical pipe = 4 cm.
29. 0.9; 150 rotten mangoes.