

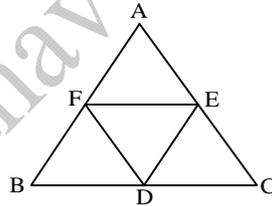
Test Paper

Time : 3 hours

Maximum Marks: 80

SECTION – A

1. State fundamental theorem of Arithmetic.
2. Find the sum and product of zeroes of $p(x) = \frac{1}{2}x^2 - x + \frac{1}{3}$.
3. Find the value of 'p' if the quadratic equation $px^2 + 4x + 1 = 0$ has repeated roots.
4. Find the discriminant of $4x^2 + 4\sqrt{3}x + 3 = 0$
5. Find the 12th term of: $-3, -\frac{1}{2}, 2, \dots$
6. Express $\cot 85^\circ + \cos 75^\circ$ in terms of trigonometric ratios of angle between 0° and 45° .
7. The length of a tangent from a point A at distance 5 cm from centre of the circle is 4 cm . Find the radius of circle.
8. Find the circumference of a sector of angle 60° of a circle with radius 10 cm .
9. 1000 tickets of lottery were sold and there are 5 prizes on these tickets. If Anshul has purchased a ticket, what is the probability of winning a prize?
10. ABC and FDE are two equilateral triangles such that D is the midpoint of BC. Find the ratios of the areas of triangles ABC and FDE.



SECTION – B

11. Solve $x - 3y - 7 = 0, 3x - 3y = 15$.
12. Apply division algorithm to find the quotient and remainder obtained on dividing p(x) by g(x) where $p(x) = 2x^2 + 3x + 1, g(x) = 2 + x$.

OR

Find the zeroes of $3x^2 - x - 4$ and verify the relationship between zeroes and coefficients.

13. Evaluate: $\frac{5 \sin^2 30^\circ + \cos^2 45^\circ + 4 \tan^2 60^\circ}{2 \sin 30^\circ \cdot \cos 60^\circ + \tan 45^\circ}$.
14. If A and B are (4, 3) and (8, 5) respectively. Find the coordinates of P such that $AP = \frac{3}{4} AB$.
15. The incircle of a triangle ABC touches the sides AB, BC and CA at the points P, Q, R respectively. Show that:

$$AP + BQ + CR = PB + QC + RA = \frac{1}{2}(\text{Perimeter of } \triangle ABC).$$

SECTION – C

16. Solve $2x^2 + 14x + 9 = 0$, by completing the squares when
OR

The sum of n terms of an A.P. is $S_n = \frac{5n^2}{2} + \frac{3n}{2}$. Find its 20th term.

17. Prove that the square of any positive integer is of the form $5q$, $5q + 1$ or $5q + 4$ for some integer q .
18. Prove the following identity:
 $(1 + \tan A \tan B)^2 + (\tan A - \tan B)^2 = \sec^2 A \cdot \sec^2 B$
19. Prove that the points $(3, 0)$, $(4, 5)$, $(-1, 4)$ and $(-2, -1)$ taken in order, form a rhombus. Also find its area.
20. Construct a triangle similar to a given triangle ABC such that each of its sides is $\frac{3}{4}$ th of the corresponding sides of $\triangle ABC$. It is given that $AB = 3\text{cm}$, $BC = 4\text{cm}$ and $CA = 5\text{cm}$.
21. Show graphically that the system of equations $2x + y = 6$, $6x + 3y = 18$ has infinitely many solutions.
22. Find the coordinates of the point of trisection of the line segment joining $(4, -1)$ and $(-2, -3)$.
23. A piggy bank contains hundred 50 paise coins, fifty Rs.1 coins, twenty Rs.2 coins and ten Rs.5 coins. If it is equally likely that one of the coins will fall out when the bank is turned upside down, what is the probability that the coin
i) will be a fifty paise coin? ii) will not be a fifty paise coin?
24. In the adjoining figure, ABC is a right triangle with $\angle ABC = 90^\circ$, $BD \perp AC$, $DM \perp BC$ and $DN \perp AB$. (Fig 1) Prove that:
i) $DM^2 = DN \times MC$ ii) $DN^2 = DM \times AN$.

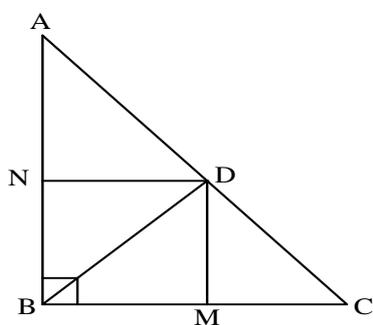


Fig 1

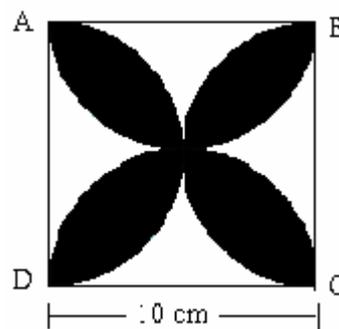


Fig 2.

OR

“If a line is drawn parallel to one side of a triangle intersecting the other two sides, then it divides the two sides in the same ratio”, prove it.

25. Find the area of shaded region in the given figure, where ABCD is a square of side 10cm and semicircles are drawn with each side of the square as diameter. (Use $\pi = 3.14$) (Fig 2).

SECTION – D

26. The angle of elevation of a cloud from a point h metres above a lake is α and the angle of depression of its reflection in the lake is β . Prove that the distance of cloud from the point of observation is $\frac{2h \sec \alpha}{\tan \beta - \tan \alpha}$.
27. State and prove the converse of pythagorus theorem:
In a isosceles triangle with $AB = AC$ if $2AB^2 = BC^2$, then prove that angle A right angle , using above theorem
28. Sum of the areas of two squares is 468 m^2 . If the difference of their perimeters is 24cm , find the sides of the two squares.

OR

- A takes 10 days less than the time taken by B to finish a piece of work. If both A and B together can finish the work in 12 days, find the time taken by B to finish the work alone.
29. An oil funnel made of tin sheet consists of a cylindrical portion 10cm , long attached to a frustum of a cone. If the total height is 22cm , diameter of the cylindrical portion is 8cm and the diameter of the top of the funnel is 18cm , find the area of the tin sheet required to make the funnel
30. The following table shows the ages of the patients admitted in a hospital during a year. Draw the ogive and find the median :

Age (in years) (more than)	Number of patients
5	80
15	74
25	63
35	42
45	19
55	5

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Tution for Maths and Commerce

For IX , X , XI , XII

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