

SIR CV RAMAN COACHING CENTRE – IDAPPADI,SALEM

XL MATHS UNIT -2- MODEL QUESTION PAPER -2024

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Section – A (20 x 5 = 100)

I. Answer any 20 questions

1. Find two irrational numbers such that their sum is a rational number. Can you find two irrational numbers whose product is a rational number

2. Find a positive number smaller than $\frac{1}{2^{1000}}$. Justify.

3. Solve $|2x - 17| = 3$ for x .

4. Solve $\left| \frac{2}{x-4} \right| > 1, x \neq 4$.

5. Solve $|5x - 12| < -2$.

6. Our monthly electricity bill contains a basic charge, that is independent of units consumed and a charge that depends on the units consumed. Let us say Electricity Board charges Rs.110 as basic charge and charges Rs. 4 for each unit we use. If a person wants to keep his electricity bill below Rs.250, then what should be his electricity usage?

7. A girl A is reading a book having 446 pages and she has already finished reading 271 pages. She wants to finish reading this book within a week. What is the minimum number of pages she should read per day to complete reading the book within a week?

8. solve (i) $\frac{3(x-2)}{5} \leq \frac{5(2-x)}{3}$. (ii) $\frac{5-x}{3} < \frac{x}{2} - 4$.

9. A and B are working on similar jobs but their monthly salaries differ by more than Rs 6000. If B earns rupees 27000 per month, then what are the possibilities of A's salary per month?

10. Construct a quadratic equation with roots 7 and -3:

11. Discuss the nature of roots of (i) $-x^2 + 3x + 1 = 0$,

12. Solve the equation $\sqrt{6 - 4x - x^2} = x + 4$.

13. Find the real roots of $x^4 = 16$.

14. Find the values of p for which the difference between the roots of the equation $x^2 + px + 8 = 0$ is 2.

15. Find all values of x that satisfies the inequality $\frac{2x - 3}{(x - 2)(x - 4)} < 0$.

16. Resolve into partial fractions $\frac{2x}{(x^2 + 1)(x - 1)}$.

17. Resolve the following rational expressions into partial fractions $\frac{6x^2 - x + 1}{x^3 + x^2 + x + 1}$

18. Determine the region in the plane determined by the inequalities:

$$2x + y \geq 8, x + 2y \geq 8, x + y \leq 6.$$

19 Simplify $\frac{1}{3 - \sqrt{8}} - \frac{1}{\sqrt{8} - \sqrt{7}} + \frac{1}{\sqrt{7} - \sqrt{6}} - \frac{1}{\sqrt{6} - \sqrt{5}} + \frac{1}{\sqrt{5} - 2}$.

20. Evaluate $\left(\left((256)^{-1/2} \right)^{\frac{-1}{4}} \right)^3$.

21. Prove $\log a + \log a^2 + \log a^3 + \dots + \log a^n = \frac{n(n+1)}{2} \log a$.

22. Prove $\log \frac{a^2}{bc} + \log \frac{b^2}{ca} + \log \frac{c^2}{ab} = 0$.

23. Prove $\log \frac{75}{16} - 2 \log \frac{5}{9} + \log \frac{32}{243} = \log 2$.

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