Class:10

Register Number

FIRST MID TERM TEST - 2024

MATHEMATICS

Time Allowed : 1.30 Hours] [Max. Marks : 50

PART - A

I. Choose the correct Answer. 7x1=7

1. If there are 1024 relations from a set A = {1,2,3,4,5} to a set B, then the number of elements in B is

(a) 3 (b) 2 (c) 4 (d) 8

2. If $f(x) = 2x^2$ and $g(x) = \frac{1}{3x}$, then fog is

(a) $\frac{3}{2x^2}$ (b) $\frac{2}{3x^2}$ (c) $\frac{2}{9x^2}$ (d) $\frac{1}{6x^2}$

3. Given $F_1 = 1$, $F_2 = 3$ and $F_n = F_{n-1} + F_{n-2}$ then F_5 is

(a) 3 (b) 5 (c) 8 (d) 11

4. The value of $(1^3 + 2^3 + 3^3 + \ldots\ldots + 15^3) - (1 + 2 + 3 + \ldots\ldots + 15)$ is

(a) 14400 (b) 14200 (c) 14280 (d) 14520

5. $\frac{3y-3}{y} \div \frac{7y-7}{3y^2}$ is

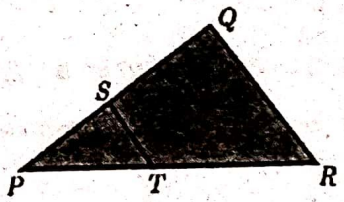
(a) $\frac{9y}{7}$ (b) $\frac{9y^3}{(21y-21)}$ (c) $\frac{21y^2-42y+21}{3y^3}$ (d) $\frac{7(y^2-2y+1)}{y^2}$

6. Which of the following should be added to make x^4+64 a perfect square

(a) $4x^2$ (b) $16x^2$ (c) $8x^2$ (d) $-8x^2$

7. In a given figure ST||QR, PS = 2cm and SQ = 3 cm.
Then the ratio of the area of ΔPQR to the area of ΔPST is

(a) 25 : 4 (b) 25 : 7
(c) 25 : 11 (d) 25 : 13



PART - B

II. Answer any five questions only. [Q.No. 14 is compulsory]. 5x2=10

8. If AxB = {(3,2), (3,4), (5,2), (5,4)} then find A and B.

9. Find the value of k, such that fog = gof. f(x) = 3x+2, g(x) = 6x-k.

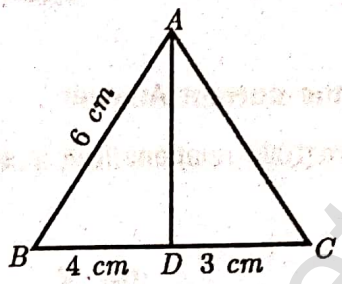
10. Solve: $5x \equiv 4 \pmod 6$

11. Find x so that x+6, x+12 and x+15 are consecutive terms of a Geometric Progression.

12. Find the excluded values, if any of the following expression: $\frac{y}{y^2-25}$

13. Find the zeros of the quadratic expression $x^2+8x+12$.

14. In the Figure, AD is the bisector of $\angle A$.
If BD = 4 cm, DC = 3 cm and AB = 6cm,
find AC.



PART - C

III. Answer any 5. Q.No. 21 is compulsory. **5x5=25**

15. Let A = { $x \in W$ |x< 2}, B = { $x \in N$ | 1 < $x \leq 4$} and C = {3,5}
Verify that A x (B∪C) = (AxB)∪(AxC).

16. If f(x) = 2x+3, g(x) = 1-2x and h(x) = 3x. Prove that $f \circ (g \circ h) = (f \circ g) \circ h$.

17. Find the sum of all natural numbers between 300 and 600 which are divisible by 7.

18. Rakha has 15 square colour papers of sizes 10cm, 11cm, 12cm... 24 cm. How much area can be decorated with these colour papers?

19. Vani, her father and her grandfather have an average age of 53. One-half of her grandfather's age plus one-third of her father's age plus one-fourth of Vani's age is 65. Four years ago if Vani's grandfather was four times as old as Vani then how old are they all now?

20. If $9x^4 + 12x^3 + 28x^2 + ax + b$ is a perfect square, find the values of a and b.

21. State and prove Thales Theorem.

PART - D

IV. Answer Any One of the following. **1x8=8**

22. a) A garment shop announces a flat 50% discount on every purchase of items for their customers. Draw the graph for the relation between the Marked Price and the Discount. Hence find:
i) the marked price when a customer gets a discount of ₹ 3250 (from graph)
ii) the discount when the marked price is ₹ 2500.

(OR)

b) Construct a ΔPQR which the base PQ = 4.5 cm, $\angle R = 35^\circ$ and the median from R to RG is 6 cm.