



COMMON FIRST MID-TERM TEST – 2023

Standard X

Reg.No. :

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MATHEMATICS

Time: 1.30 hrs.

Part - I

Marks: 50

I. Choose the correct answer:

4 x 1 = 4

1. If $n(A \times B) = 6$ and $A = \{1, 3\}$, then $n(B)$ is
a) 1 b) 2 c) 3 d) 6
2. Let $f(x) = \sqrt{1+x^2}$ then
a) $f(xy) = f(x).f(y)$ b) $f(xy) \geq f(x).f(y)$
c) $f(xy) \leq f(x).f(y)$ d) none of these
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. If 6 times of 6th term of an A.P is equal to 7 times the 7th term, then the 13th term of the A.P is
a) 0 b) 6 c) 7 d) 13

Part - II

II. Answer any five questions.

5 x 2 = 10

5. If $A = \{1, 3, 5\}$ and $B = \{2, 3\}$, then find $A \times B$ and $B \times A$
6. Let $A = \{3, 4, 7, 8\}$ and $B = \{1, 7, 10\}$. Which of the following sets are relations From A. to B?
i) $R_1 = \{(3, 7), (4, 7), (7, 10), (8, 1)\}$ ii) $R_2 = \{(3, 1), (4, 12)\}$
7. If $f(x) = 2x - 1$, $g(x) = \frac{x+1}{2}$, show that $f \circ g = g \circ f = x$
8. We have 34 cakes. Each box can hold 5 cakes only. How many boxes we need to pack and how many cakes are unpacked?
9. If $3+k$, $18-k$, $5k+1$ are in A.P, then find k .
10. Check whether the following sequences in GP : 16, 4, 1, $\frac{1}{4}$,
11. Find the value of the series : $16 + 17 + 18 + \dots + 75$

Part - III

III. Answer any four questions.

4 x 5 = 20

12. Let $A = \{x \in \mathbb{N} / 1 < x < 4\}$, $B = \{x \in \mathbb{W} / 0 \leq x < 2\}$ and $C = \{x \in \mathbb{N} / x < 3\}$. Then verify that $A \times (B \cap C) = (A \times B) \cap (A \times C)$
13. Represent the given relations by (a) an arrow diagram (b) a graph and (c) a set in roster form wherever possible: $\{(x, y) / x = 2y, x \in \{2, 3, 4, 5\}, y \in \{1, 2, 3, 4\}\}$

(2)

X Maths

14. If the function f is defined by $f(x) = \begin{cases} x + 2 & \text{if } x > 1 \\ 2 & \text{if } -1 \leq x \leq 1 \\ x - 1 & \text{if } -3 < x < -1 \end{cases}$, find the values of

i) $f(3)$ ii) $f(0)$ iii) $f(-15)$ iv) $f(2) + f(-2)$

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

16. Find the sum to n terms of the series $3 + 33 + 333 + \dots$ to n terms.

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

Part - IV

IV. Answer both the questions.

2 x 8 = 16

18. a) Construct a triangle similar to a given triangle PQR with its sides equal to $\frac{4}{5}$ of the corresponding sides of the triangle PQR (scale factor $\frac{4}{5} < 1$)

(OR)

b) Construct a triangle similar to a given triangle PQR with its sides equal to $\frac{7}{4}$ of the corresponding sides of the triangle PQR (scale factor $\frac{7}{4} > 1$)

19. a) A bus is travelling at a uniform speed of 50 km/hr. Draw the distance-time graph and hence find,

- The constant of variation
- How far will it travel in 90 minutes
- The time required to cover a distance of 300 km from the graph.

(OR)

b) The following table shows the data about the number of pipes and the time taken to fill the same tank.

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|-----------------------------|----|----|----|----|
| No. of pipes (x) | 2 | 3 | 6 | 9 |
| Time taken (in min) (y) | 45 | 30 | 15 | 10 |

Draw the graph for the above data and hence

- Find the time taken to fill the tank when five pipes are used
- Find the number of pipes when the time is 9 minutes.
