

Ts11M

Tenkasi District
First Mid Term Test - 2023



09-08-2023

Standard 11

Time: 1.30 Hours

MATHS

Marks: 45

PART - A

Choose the correct answer.

10×1=10

- 1) The number of relations on a set containing 3 elements is
a) 9 b) 81 c) 512 d) 1024
- 2) The range of the function $\frac{1}{1-2\sin x}$ is
a) $(-\infty, -1) \cup (\frac{1}{3}, \infty)$ b) $(-1, \frac{1}{3})$
c) $[-1, \frac{1}{3}]$ d) $(-\infty, -1] \cup [\frac{1}{3}, \infty)$
- 3) The number of constant functions from a set containing m elements to a set containing n elements is
a) mn b) m c) n d) m + n
- 4) The number of reflexive relations on a set containing 4 elements is
a) 2^6 b) 2^4 c) 2^3 d) 2^{12}
- 5) If 3 is the logarithm of 343, then the base is
a) 5 b) 7 c) 6 d) 9
- 6) If $\frac{1-2x}{3+2x-x^2} = \frac{A}{3-x} + \frac{B}{x+1}$, then the value of A + B is
a) $-\frac{1}{2}$ b) $-\frac{2}{3}$ c) $\frac{1}{2}$ d) $\frac{2}{3}$
- 7) Given that x, y and b are real numbers $x < y$, $b > 0$ then
a) $xb < yb$ b) $xb > yb$ c) $xb \leq yb$ d) $\frac{x}{b} \geq \frac{y}{b}$
- 8) If $|x+2| \geq 9$, then x belongs to
a) $(-\infty, -7)$ b) $[-11, 7]$
c) $(-\infty, -7) \cup [11, \infty)$ d) $(-11, 7)$
- 9) $\cos(270^\circ - \theta) = ?$
a) $\cos \theta$ b) $-\cos \theta$ c) $\sin \theta$ d) $-\sin \theta$
- 10) $\frac{\pi}{5}$ radians = degrees.
a) 30° b) 32° c) 36° d) 38°

PART - B

Answer 4 questions. Qn. no. 15 is compulsory.

4×2=8

11) If $n[P(A)] = 1024$, $n(A \cup B) = 15$ and $n[p(B)] = 32$, then find $n(A \cap B)$ 12) Solve $\left| \frac{2}{x-4} \right| > 1, x \neq 4$

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13) Evaluate : $\left[\left((256)^{-1/2} \right)^{-1/4} \right]^3$

14) Prove that $\frac{\tan \theta + \sec \theta - 1}{\tan \theta - \sec \theta + 1} = \frac{1 + \sin \theta}{\cos \theta}$

15) Find the domain of $f(x) = \frac{1}{1 - 2 \cos x}$

PART - C**Answer 4 questions. Qn. no. 20 is compulsory.****4×3=12**

16) If $A = \{ 1, 2, 3 \}$, $B = \{ 3, 4, 5 \}$, $C = \{ 1, 4, 6 \}$ verify the result

$$A \times (B \cap C) = (A \times B) \cap (A \times C)$$

17) From the curve $y = x^2$, draw

i) $y = -x^2$ ii) $y = x^2 + 1$

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

19) Determine whether the following functions are even, odd or neither

i) $\sin(\cos(x))$ ii) $\sin x + \cos x$

20) Find the number of solutions of $x^2 + |x - 1| = 1$

PART - D**Answer all the questions.****3×5=15**

21) a) If $f, g: \mathbb{R} \rightarrow \mathbb{R}$ are defined by $f(x) = |x| + x$ and $g(x) = |x| - x$, find $g \circ f$ and $f \circ g$

(OR)

b) If one root of $k(x - 1)^2 = 5x - 7$ is double the other root, show that $k = 2$ or (-25) .

22) a) On the set of natural numbers let r be the relation defined by aRb if $2a + 3b = 30$. Write down the relation by listing all the pairs. Check whether it is

i) Reflexive ii) Symmetric iii) Transitive iv) equivalence

(OR)

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

23) a) Find the values of other five trigonometric functions for the following:

$\sin \theta = -\frac{2}{3}, \theta$ lies in the IV quadrant.

(OR)

b) Resolve the given rational expressions into partial fraction:

$$\frac{x}{(x^2 + 1)(x - 1)(x + 2)}$$

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