INFINITY THINK BEYOND.....

AN EDUCATIONAL INSTITUTE

XII MIND CURVE Mid Term Maths Test Series 2025-26

Test 01

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S no	Syllabus Covered	Chapters(In Half Yearly)	Marking Scheme
1.	Chapter 1	Relation &Function	25
2	Chapter2	Inverse Trigonometry Function	15

Note: Students/Teachers can refer to this Sample Paper for practice purpose. However, students may find or experience different exam pattern as syllabus or marking scheme may vary school to school.

MM:40	GENERAL INSTRUCTIONS	Time1.5Hrs

READ CAREFULLY ALL INSTRUCTIONS

1. **This Question Paper has 5 Sections A, B, C, D and E.**
2. **Section A has 10 MCQs carrying 1 mark each**
3. **Section B has 3 questions carrying 02 marks each.**
4. **Section C has 2 questions carrying 03 marks each.**
5. **. Section D has 2 case based integrated units of assessment (04 marks each) with sub parts of the values of 1, 1 and 2 marks each respectively.**
6. **Section 5 has 2 questions carrying 05 marks each**
7. **All Questions are compulsory. E**
8. **This paper consists of 19 questions.**
   a. **Write your answers neatly and legibly.**
   b. **Ensure you have not left any question unanswered**

SECTION – A

Questions 1 to 10 carry 1 mark each.

1. Let N be the set of natural numbers and the function $f: N \to N$ be defined by $(n) = 2n + 1 \; \forall \; n \in N$. Then f is

(a) Surjective (b) injective (c) bijective (d) none of these

2. The number of bijective functions from set A to itself when A contains 106 elements is

(a) 106 (b) $(106)^2$ (c) 106! (d) 2^{106}

3. The principal value of $\tan^{-1}\left(\tan\frac{3\pi}{5}\right)$ is

(a) $\frac{2\pi}{5}$ (b) $-\frac{2\pi}{5}$ (c) $\frac{3\pi}{5}$ (d) $-\frac{3\pi}{5}$

4. Let A={2,4}. Then the total number of reflexive relations on A is

(a)2 (b)4 (c)0 (d)8

5.A function f: R + → R (where R+ is the set of all non –negative real numbers) defined by f(x)=4x+3 is

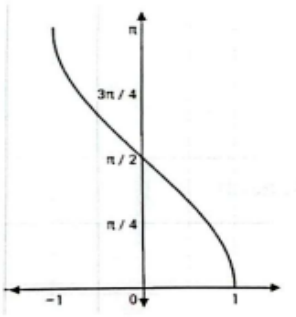
(a) One –one but onto (b) onto but not one-one

(c)Both one-one and onto (d) neither one –one nor onto

6. The value of $\cos\left(\frac{\pi}{6}+\cot^{-1}\left(-\sqrt{3}\right)\right)$ is

(a)-1 (b) $-\frac{\sqrt{3}}{2}$ (c) 0 (d) 1

7. The graph drawn below depicts



(a) $y=\sin^{-1}x$ (b) $y=\cos^{-1}x$ (c) $y=\sec^{-1}x$ (d) $y=\cot^{-1}x$

8.The function f:R → Z defined by f(x)=[x]; Where [x] denotes the greatest integer function , is

(a) Continuous at x=2.5 but not differentiable at x=2.5

(b) Not Continuous at x=2.5 but differentiable at x=2.5

(c) Not Continuous at x=2.5 but not differentiable at x=2.5

(d) Continuous as well as differentiable at x=2.5

Question numbers 9 and 10 are Assertion and Reason based questions

Two statements are given, one labelled as Assertion (A) and the other is labelled as Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below.

(a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).

(b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).

(c) Assertion (A) is true, but Reason (R) is false.

(d) Assertion (A) is false, but Reason (R) is true.

9. **Assertion(A):** Principal value of $tan^{-1}(-1)=\frac{\pi}{4}$

Reason(R): $tan^{-1}: R \rightarrow \left(-\frac{\pi}{2},\frac{\pi}{2}\right)$

10. Assertion(A): If $cos\left(cos^{-1}\frac{2}{3}+sin^{-1}x\right)=0\ then\ x=\frac{2}{3}$

Reason(R): $sin^{-1}x+cos^{-1}x=\left(\frac{\pi}{2}\right)$

SECTION – B
Questions 11 to 13 carry 2 mark each.

11(A). Write the value of $\tan^{-1}\left[2\sin\left(2\cos^{-1}\frac{\sqrt{3}}{2}\right)\right]$

Or

11(B). Simplify $\sec^{-1}\left(\frac{1}{2x^2-1}\right)$, $0<x<\frac{1}{\sqrt{2}}$

12. Write the principal value of the following$\left[cos^{-1}\frac{\sqrt{3}}{2}+cos^{-1}\left(\frac{-1}{2}\right)\right]$

13. Find the value of $\sin\left\{2cot^{-1}\left(-\frac{5}{12}\right)\right\}$

SECTION – C
Questions 14 to 15 carry 3 mark each

14(A). If $A = R - \{3\}$ and $B = R - \{1\}$. Consider the function $f : A \to B$ defined by $(x) = \frac{x-2}{x-3}$ for all $x \in A$. Then show that f is bijective.

Or

14(B). A function $f: R \to R$ is defined as $(x) = 2x^2 + 3$. Show that (x) is neither one-one nor onto

15. Find a and b if $a \leq sin^{-1}x + cos^{-1}x \leq b$.

SECTION – D
Questions 16 to 17 carry 4 mark each.

16. Shantanu and Dharna are playing Ludo at home. While rolling the dice, shantanu's sister Shefali observed and noted the possible outcomes of the throw every time and named the set as A. She got A= {1,2,3,4,5,6}.Let relation R: A→ A be defined by R = {(x,y) : y is divisible by x}

(i)Is relation R reflexive? Give reason

(ii)Check whether R is symmetric?

(iii)Write the number of reflexive relations on A .

(iv)Let R be a relation on A defined by R={(1,2),(2,2),(1,3),(3,4),(3,1),(4,3),(5,5)}.Is R is an equivalence relation, justify.

17. Students of a school are taken to railway museum to learn about railways heritage and its history. An exhibit in the museum depicted many rail lines on the track near the railway station. Let L be the set of all rail lines on the railway track and R be the relation on L defined by R = {(L_1, L_2): L_1 is parallel to L_2}. On basis of the above information, answer the following questions.

(i) Find whether the relation R is symmetric or not.

(ii) Find whether the relation R is transitive or not.

(iii) If one of the rail lines on the railway track is represented by the equation y = 3x + 2, then find the set of rail lines in R related to it.

SECTION – E
Questions 18 to 19 carry 5 mark each.

18. If N denotes the set of all natural numbers and R is the relation on $N \times N$ defined by $(a, b)\ R\ (c, d)$ if ad$(b + c)$ = bc$(a + d)$. Show that R is an equivalence relation.Find [(1,1)]

19. Consider f: $R_+ \to [-5,\infty)$ given by $f(x)=9x^2+6x-5$. Show that f is bijective.

END