



In The Service of Student Community

Time hour **Sample Paper: Class XII** **MM 32**
Relations & Functions, Continuity, Matrices & Determinants, Inverse
Trigonometric Functions

1. If $A = \begin{bmatrix} \cos \alpha & \sin \alpha \\ -\sin \alpha & \cos \alpha \end{bmatrix}$, show that $A^2 = \begin{bmatrix} \cos 2\alpha & \sin 2\alpha \\ -\sin \alpha & \cos 2\alpha \end{bmatrix}$ 1

2. If $A = \{-1, 0, 1\}$ and $f = \{(x, x^2) : x \in A\}$. Show that $f : A \rightarrow A$ is neither one one nor onto. 1

3. For what choice of k is the function $f(x) = \begin{cases} \frac{\sin 5x}{3x} & \text{if } x \neq 0 \\ k & \text{if } x = 0 \end{cases}$ continuous. 1

4. Write $\sin^{-1}\left(2x\sqrt{1-x^2}\right)$, $-\frac{1}{\sqrt{2}} \leq x \leq \frac{1}{\sqrt{2}}$ in the simplest form. 1

5. Show that $\begin{vmatrix} a-b-c & 2a & 2a \\ 2b & b-c-a & 2b \\ 2c & 2c & c-a-b \end{vmatrix} = (a+b+c)^3$ 4

6. Let N be the set of all natural numbers. Show that the relation R on $N \times N$, defined by $(a, b)R(c, d) \Leftrightarrow a + d = b + c \forall (a, b), (c, d) \in N \times N$ is an equivalence relation.

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7. Prove that $\lim_{x \rightarrow 0} \frac{e^x - 1}{\frac{1}{e^x + 1}}$ does not exist. 4
8. Solve: $2 \tan^{-1}(\cos x) = \tan^{-1}(2 \cos \operatorname{cosec} x)$. 4
9. If $A = \begin{bmatrix} 2 & 1 & 1 \\ 2 & 0 & 1 \\ 0 & -2 & -1 \end{bmatrix}$, then by finding A^{-1} solve the equations $2x + y + z = 3$,
 $2x + z = 5$, $-2y - z = 1$ 6
10. The function f defined as $f(x) = \begin{cases} x^2 + ax + b, & 0 \leq x \leq 2 \\ 3x + 2, & 2 \leq x \leq 4 \\ 2ax + 5b, & 4 \leq x \leq 8 \end{cases}$ If f is continuous on $[0, 8]$
 find the values a and b . 6

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