# MATHS

## BOOKS - TELUGU ACADEMY MATHS (TELUGU ENGLISH)

## PRACTICE MODEL PAPER-5

Vsaq

**1.** If $A = \left\{0, \frac{\pi}{6}, \frac{\pi}{4}, \frac{\pi}{3}, \frac{\pi}{2}\right\}$ and $f: A \to B$ is a surjection defined by $f(x) = \cos x$ then find B.

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**2.** Find the domain of the real function $f(x) = \frac{1}{\log(2 - x)}$

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**3.** If $\begin{bmatrix} x-1 & 2 & 5-y \\ 0 & z-1 & 7 \\ 1 & 0 & a-5 \end{bmatrix} = \begin{bmatrix} 1 & 2 & 3 \\ 0 & 4 & 7 \\ 1 & 0 & 0 \end{bmatrix}$ then find the values of x , y z and a .

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**4.** If $A = \begin{bmatrix} 1 & 0 & 0 \\ 2 & 3 & 4 \\ 5 & -6 & x \end{bmatrix}$ det A = 45 then find x.

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**5.** Find a vector in the direction of vector $\bar{a} = \bar{i} - 2\bar{j}$ has magnitude 7 units.

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**6.** If the position vectors of the points A,B,C are $-2\bar{i} + \bar{j} - \bar{k}, \ -4\bar{i} + 2\bar{j} + 2\bar{k}, 6\bar{i} - 3\bar{j} - 13\bar{k}$ respectively and

$\overline{AB} = \lambda\overline{AC}$ then find the value of $\lambda$.

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**7.** If $\bar{a} = \bar{i} - \bar{j} - \bar{k}, \bar{b} = 2\bar{i} - 3\bar{j} + \bar{k}$ then find the projection vector of $\bar{b}$ on $\bar{a}$ and its magnitude.

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**8.** If $\cos\theta + \sin\theta = \sqrt{2}\cos\theta$ then S.T $\cos\theta - \sin\theta = \sqrt{2}\sin\theta$

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**9.** Find the period of $\tan\left(x + 4x + 9x + \ldots\ldots + n^2x\right)$ (n any positive integer)

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**10.** Prove that $(\cosh x - \sinh x)^n = \cosh(nx) - \sinh(nx)$

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## Saqs

**1.** Show that the matrix $A = \begin{bmatrix} 1 & 2 & 1 \\ 3 & 2 & 3 \\ 1 & 1 & 2 \end{bmatrix}$ is non-singular and find $A^{-1}$.

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**2.** If ABCDEF is a regular hexagon with centre O , then P.T $\overline{AB} + \overline{AC} + \overline{AD} + \overline{AE} + \overline{AF} = 3\overline{AD} = 6\overline{AO}$

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**3.** If $\bar{a} + \bar{b} + \bar{c} = \bar{0}$ then prove that $\bar{a} \times \bar{b} = \bar{b} \times \bar{c} = \bar{c} \times \bar{a}$.

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**4.** Show that $\sin^4.\frac{\pi}{8}+\sin^4.\frac{3\pi}{8}\sin^4.\frac{5\pi}{8}+\sin^4.\frac{7\pi}{8}=\frac{3}{2}$

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**5.** Solve $\sin x+\sqrt{3}\cos x=\sqrt{2}$

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**6.** Prove that $\sin^{-1}\frac{3}{5}+\sin^{-1}\frac{8}{17}=\cos^{-1}\frac{36}{85}$

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**7.** Show that $r_1+r_2+r_3-r=4R$

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Laqs

**1.** If $f: A \to B, g: B \to C$ are two bijective functions then P.T $(\text{gof})^{-1} = f^{-1}\text{og}^{-1}$

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**2.** Statement -I: $f: A \to B$ is one -one and $g: B \to C$ is a one-one function, then $gof: A \to C$ is one-one

Statement-II: If $f: A \to B, g: B \to A$ are two functions such that gof $= I_A$ and $fog = I_B$, then $f = g^{-1}$.

Statement-III: $f(x) = \sec^2 x - \tan^2 x, g(x) = \text{cosec}^2 x - \cot^2 x,$ then f=g. Which of the above statements is/are true:

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**3.** Using the principle of Mathematical Induction, show that $2.4^{2n+1} + 3^{3n+1}$ is divisible by 11, $\forall n \in N$

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

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**5.** Solve the following system of equations by using Cramer,s ruel .

$3x + 4y + 5z = 18, 2x - y + 8z = 13, 5x - 2y + 7z = 20$

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**6.** If

$A = (1, -2, -1), B = (4, 0, -3), C = (1, 2, -1), D = (2, -4, -5)$

then find distance between $\overline{AB}, \overline{CD}$

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**7.** In triangle ABC, prove that

$$\cos.\frac{A}{2}+\cos.\frac{B}{2}+\cos.\frac{C}{2}=4\cos.\frac{\pi-A}{4}\cos.\frac{\pi-B}{4}\cos.\frac{\pi-C}{4}$$

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**8.** If $p_1, p_2, p_3$ are altitudes of a $\Delta ABC$ then show that

$$\frac{1}{p_1}+\frac{1}{p_2}+\frac{1}{p_3}=\frac{1}{r}$$

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**9.** If $P_1, P_2, P_3$ are altitudes of a $\Delta ABC$ then show that

$$\frac{1}{P_1}+\frac{1}{P_2}-\frac{1}{P_3}=\frac{1}{r_3}$$

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**10.** If $p_1, p_2, p_3$ are altitudes of a $\Delta ABC$ then show that

$$P_1P_2P_3=\frac{(abc)^2}{8R^3}=\frac{8\Delta^3}{abc}$$

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