MATHS

BOOKS - TELUGU ACADEMY MATHS (TELUGU ENGLISH)

IPE:MAY-2015[AP]

Section A

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

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2. If $A = \begin{bmatrix} 2 & -4 \\ -5 & 3 \end{bmatrix}$, then find A+A' and AA'.

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3. Find the vector equation of the plane passing through the points $\bar{i} - 2\bar{j} + 5\bar{k}, \ -5\bar{j} - \bar{k}, \ -3\bar{i} + 5\bar{j}.$

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4.   If

$\bar{a} = (1, \ -1, \ -6), \bar{b} = (1, \ -3, 4)$ and $\bar{c} = (2, \ -5, 3),$

then compare $\bar{a} \times (\bar{b} \times \bar{c}).$

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5. Find the range of $7\cos x - 24\sin x + 5$

6. Prove that $\dfrac{\cos 9° + \sin 9°}{\cos 9° - \sin 9°} = \cot 36°$

7. $\tanh^{-1}\left(\dfrac{1}{2}\right) = \dfrac{1}{2}\log_e 3$ అని చూపండి.

Section B

1. If A is a non-singular matrix then prove that $A^{-1} = \dfrac{adjA}{|A|}$.

2. If $\bar{a}, \bar{b}, \bar{c}$ are non-coplanar vectors, prove that points with position vectors $2\bar{a} + 3\bar{b} - \bar{c}, \bar{a} - 2\bar{b} + 3\bar{c}, 3\bar{a} + 4\bar{b} - 2\bar{c}$ and $\bar{a} - 6\bar{b} + 6\bar{c}$ are coplanar.

3. $|\bar{a}| = 2, |\bar{b}| = 3$ and $|2\bar{a} - \bar{b}| = 5$ then $|2\bar{a} + \bar{b}|$ equals:

4. Prove that
$$\left(1 + \cos\frac{\pi}{10}\right)\left(1 + \cos\frac{3\pi}{10}\right)\left(1 + \cos\frac{7\pi}{10}\right)\left(1 + \cos\frac{9\pi}{10}\right) = \frac{1}{16}$$

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5. If θ_1, θ_2 are solutions of the equation $a\cos 2\theta + b\sin 2\theta = c$, $\tan\theta_1 \neq \tan\theta_2$ and $a + c \neq 0$, then find the values of (i) $\tan\theta_1 + \tan\theta_2$ (ii) $\tan\theta_1 \cdot \tan\theta_2$.

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6. If θ_1, θ_2 are solutions of the equation $a\cos 2\theta + b\sin 2\theta = c$, $\tan\theta_1 \neq \tan\theta_2$ and $a + c \neq 0$, then find the values of (i) $\tan\theta_1 + \tan\theta_2$ (ii) $\tan\theta_1 \cdot \tan\theta_2$.

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7. Prove that $\tan^{-1}\left(\dfrac{1}{2}\right) + \tan^{-1}\left(\dfrac{1}{5}\right) + \tan^{-1}\left(\dfrac{1}{8}\right) = \dfrac{\pi}{4}$

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8. In a $\triangle ABC$, if $a:b:c = 7:8:9$, then find $\cos A : \cos B : \cos C$.

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Section C

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. Show that

$$\frac{1}{1.3} + \frac{1}{3.5} + \frac{1}{5.7} + \dots\dots\dots + n\text{terms} = \frac{n}{2n+1}$$

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3. Show that $\begin{vmatrix} 1 & a^2 & a^3 \\ 1 & b^2 & b^3 \\ 1 & c^2 & c^3 \end{vmatrix}$ =(a-b)(b-c)(c-a)(ab+bc+ca)

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4. Solve the system of equations by Matrix inverse method,

$$2x - y + 3z = 8, \ -x + 2y + z = 4, \ 3x + y - 4z = 0$$

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5. Prove that angle in a semi circle is a rightangle by using Vector method.

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6. IF A,B,C are angles of a triangle , Prove that $\cos 2A + \cos 2B + \cos 2C = -4\cos A \cos B \cos C - 1$

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7. In a $\triangle ABC$ if $r_1 = 8, r_2 = 12, r_3 = 24$ find a,b,c.

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