MATHS

BOOKS - TELUGU ACADEMY MATHS (TELUGU ENGLISH)

IPE: MARCH-2017 [AP]

Vsaq

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1. If $A = \{-2, -1, 0, 1, 2\}$ and $f : A \to B$ is a surjection defined by $f(x) = x^2 + x + 1$ then find B.

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2. Find the domain of the real valued function $f(x) = \sqrt{9 - x^2}$.

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3. Construct a 3×2 matrix whose elements are defined by $a_{ij} = \dfrac{1}{2}|i - 3j|$

4. If $A = \begin{bmatrix} 2 & 4 \\ -1 & k \end{bmatrix}$ and $A^2 = \begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$ then find the value of k.

5. If α, β and γ be the angle made by the vector $3\bar{i} - 6\bar{j} + 2\bar{k}$ with the positive direction of the coordinate axes, then find $\cos \alpha$, $\cos \beta$, $\cos \gamma$.

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

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 $\cos\theta = t(0 < t < 1)$ and θ does not lies in the first quadrent , find $\sin\theta$ and $\tan\theta$.

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9. Find the maximum and minimum values of $13\cos x + 3\sqrt{3}\sin x - 4$.

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10. S.T $\dfrac{\tanh^{-1}\frac{1}{2}}{2} = \dfrac{1}{2}\log_e 3.$

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

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2. If $\overrightarrow{a}$, $\overrightarrow{b}$, $\overrightarrow{c}$ are non-coplanar vectros, then prove that the four points

$-\overrightarrow{a} + 4\overrightarrow{b} - 3\overrightarrow{c}, 3\overrightarrow{a} + 2\overrightarrow{b} - 5\overrightarrow{c}, -3\overrightarrow{a} + 8\overrightarrow{b} - 5\overrightarrow{c}$ and

$-3\overrightarrow{a} + 2\overrightarrow{b} + \overrightarrow{c}$ are complanar.

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3. Find the unit vector perpendicular to the plane passing through the

points $(1, 2, 3), (2, -1, 1)$ and $(1, 2, -4)$.

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4. Prove that $\sqrt{3}\operatorname{cosec}20^\circ - \sec20^\circ = 4.$

5. Solve the equation $1 + \sin^2\theta = 3\sin\theta\cos\theta.$

6. Show that $\dfrac{\tan^{-1}1}{2} + \dfrac{\tan^{-1}1}{5} + \dfrac{\tan^{-1}1}{8} = \dfrac{\pi}{4}.$

7. If $\dfrac{\cot A}{2} : \dfrac{\cot B}{2} : \dfrac{\cot C}{2} = 3:5:7.$ Then show that $a:b:c = 6:5:4$ (In $\triangle ABC$).

1. If $f : A \rightarrow B$ is a bijective function then prove that

(i) $fof^{-1} = I_B$

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2. By mathematical induction, show that $49^n + 16n - 1$ is divisible by 64

for all positive integer n.

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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 $x + y + z = 9, 2x + 5y + 7z = 52$ and $2x + y - z = 0$ by using matrix inversion method.

5. If $A = (1, -2, -1), B = (4, 0, -3), C = (1, 2, -1), D = (2, -4, -5)$ then find distance between $\overline{AB}, \overline{CD}$

6. If $A + B + C = 180°$, then show that $\cos 2B + \cos 2B + \cos 2C = -4\cos A. \cos B. \cos C - 1.$

7. In a $!ABC$ if $r_1 = 8, r_2 = 12$ and $r_3 = 24,$ then a =