MATHS

BOOKS - VIKRAM PUBLICATION (ANDHRA PUBLICATION)

MARCH - 2016 (TELANGANA)

Section A Very Short Answer Type Questions

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. Solve the following system of homogenous equations $x + y + z = 0, x + 2y - z = 0, 2x + y + 3z = 0.$

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3. Define triangular Matrix.

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4. Let $\bar{a} = \bar{i} + 2\bar{j} + 3\bar{k}$ and $\bar{b} = 3\bar{i} + \bar{j}$. Find the unit vector in the direction of $\bar{a} + \bar{b}$.

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5. Find the vector equation of the line passing through the points $2\bar{i} + \bar{j} + 3\bar{k}$ and $-4\bar{i} + 3\bar{j} - \bar{k}$.

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6. If vectors $\lambda\bar{i} - 3\bar{j} + 5\bar{k}, 2\lambda\bar{i} - \lambda\bar{j} - \bar{k}$ are perpendicular to each other find λ.

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7. If $A + B = \frac{\pi}{4}$, then prove that $(1 + \tan A)(1 + \tan B) = 2$.

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8. Eliminate $'\theta'$ from $x = a\cos^3\theta, y = b\sin^3\theta$.

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9. If $\sin hx = 3$, then show that $x = \log_e\left(3 + \sqrt{10}\right)$.

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Section B Short Answer Type Questions

1. If $I = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ and $E = \begin{bmatrix} 0 & 1 \\ 0 & 0 \end{bmatrix}$ then show that $(aI + bE)^3 = a^3I + 3a^2bE$ where I is identify matrix of order 2.

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2. Show that the line joining the pair of points $6\bar{a} - 4\bar{b} + 4\bar{c}, \ -4\bar{c}$ and the line joining the pair of points, $-\bar{a} - 2\bar{b} - 3\bar{c}, \bar{a} + 2\bar{b} - 5\bar{c}$ intersect at the point $-4\bar{c}$ when $\bar{a}, \bar{b}, \bar{c}$ are non-coplanar vectors.

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3. Find λ in order that the four points $A(3, 2, 1), B(4, \lambda, 5), C(4, 2, \ -2)$ and $D(6, 5, \ -1)$ be coplanar.

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4. If none of the denominators is zero, prove that.

$$\left(\frac{\cos A+\cos B}{\sin A-\sin B}\right)^n+\left(\frac{\sin A-\sin B}{\cos A+\cos B}\right)^n=\begin{cases}2\cot^n\left(\frac{A-B}{2}\right) & \text{if } n\text{is eve}\\ 0 & \text{if } n\text{is odd}\end{cases}$$

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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) $\tan\theta_1.\tan\theta_2$.

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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) $\tan\theta_1.\tan\theta_2$.

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7. Prove that $\sin^{-1}\left(\frac{4}{5}\right)+\frac{\sin^{-1}7}{25}=\frac{\sin^{-1}117}{125}$.

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8. If $a=(b-c)\sec\theta$, then prove that $\tan\theta=\frac{2\sqrt{bc}}{b-c}\frac{\sin A}{2}$.

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Section C Long Answer Type Quesitons

1. If $f:A\to B$ and $g:B\to C$ are two bijective functions then prove that $gof:A\to C$ is also a bijection.

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2. Using Mathematical induction. For all $n\in N$. Show that

$a+(a+d)+(a+2d)+\ldots\ldots\ldots\ldots n\text{upto n terms}=\frac{n}{2}[2a+(n-1)$

.

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

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4. solve the following system of equations by using Matrix inversion method.

$2x - y + 3z = 9, x + y + z = 6, x - y + z = 2.$

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5. If $\bar{a} = \bar{i} - 2\bar{j} + 3\bar{k}, \bar{b} = 2\bar{i} + \bar{j} + \bar{k}, \bar{c} = \bar{i} + \bar{j} + 2\bar{k}$ then find $|(a \times b) \times c)|$ and $|a \times (b \times c)|$.

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6. If $A + B + C = 2S$, then prove that

$$\sin(S - A) + \sin(S - B) + \sin C = 4\cos\left(\frac{S - A}{2}\right)\cos\left(\frac{S - B}{2}\right)\frac{\sin C}{2}$$

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7. If $r_1 = 2, r_2 = 3, r_3 = 6$ and $r = 1,$ prove that a=3,b=4 and c=5.

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