MATHS

BOOKS - TELUGU ACADEMY MATHS (TELUGU ENGLISH)

IPE:MARCH-2017(TS)

Questions

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. IF $f(x) = 2, g(x) = x^2, h(x) = 2x$ then find (fogoh)(x)

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3. IF $A = \begin{bmatrix} 3 & 2 & -1 \\ 2 & -2 & 0 \\ 1 & 3 & 1 \end{bmatrix} B = \begin{bmatrix} -3 & -1 & 0 \\ 2 & 1 & 3 \\ 4 & -1 & 2 \end{bmatrix}$ and X=A+B then find X.

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4. IF $A = \begin{bmatrix} -1 & 2 \\ 0 & 1 \end{bmatrix}$ then find AA'.

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5. If $\bar{a} = 2\bar{i} + 5\bar{j} + \bar{k}, \bar{b} = 4\bar{i} + m\bar{j} + n\bar{k}$ are collinear vectors then find m and n.

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6. Find the vector equation of the line passing through the point $2\bar{i} + 3\bar{j} + \bar{k}$ and parallel to the vector $4\bar{i} - 2\bar{j} + 3\bar{k}$

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7. Find the angle between the vectors $\bar{i} + 2\bar{j} + 3\bar{k}$ and $3\bar{i} - \bar{j} + 2\bar{k}$

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8. IF $\sin\theta = \frac{4}{5}$ and θ is not in the first quadrant, find the value of $\cos\theta$.

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9. Prove that $\cos 48^\circ . \cos 12^\circ = \frac{3+\sqrt{5}}{8}$.

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10. IF $\cosh x = 5/2$, then find the value of (i) cosh(2x) and (ii) sinh(2x)

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11. Show that $\begin{vmatrix} 1 & a & a^2 \\ 1 & b & b^2 \\ 1 & c & c^2 \end{vmatrix} = (a-b)(b-c)(c-a)$

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

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13. IF $\bar{a}=2\bar{i}+\bar{j}-\bar{k}, \bar{b}=-\bar{i}+2\bar{j}-4\bar{k}, \bar{c}=\bar{i}+\bar{j}+\bar{k}$ then find $(\bar{a}\times\bar{b}).(\bar{b}\times\bar{c})$

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14. Find the range of $13\cos x+3\sqrt{3}\sin x-4$

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15. Solve $1 + \sin^2\theta = 3\sin\theta\cos\theta$

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16. Show that $\cot\left(\sin^{-1}\sqrt{\frac{13}{17}}\right) = \sin\left(\tan^{-1}\frac{2}{3}\right)$.

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17. In ΔABC, if $\frac{1}{a+c} + \frac{1}{b+c} = \frac{3}{a+b+c}$ then show that $C = 60^\circ$

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18. If Q is the set of all rational numbers, and $f: Q \to Q$ is defined by $f(x) = 5x + 4$, $\forall x \in Q$, show that f is a bijection.

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19. If $f = \{(4, 5), (5, 6), (6, -4)\}, g = \{(4, -4), (6, 5), (8, 5)\}$ find (iii)

fg

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20. Using Mathematical Induction, prove that statement for all $n \in N$

$1.2.3 + 2, 3, 4 + \ldots\ldots\ldots + (\text{upto n terms}) = \frac{n(n+1)(n+2)(n+3)}{4}$

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21. Solve the following system of equations by using Cramer's rule.

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

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22. 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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23. IF $A = \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{bmatrix}$ then show that $A^2 - 4A - 5I = O$.

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24. Find the shortest distance between the skew lines .

$\bar{r} = (6\bar{i} + 2\bar{j} + 2\bar{k}) + t(\bar{i} - 2\bar{j} + 2\bar{k})$ and $\bar{r} = (-4\bar{i} - \bar{k}) + s(3\bar{i} - 2\bar{j} -$

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25. IF A+B+C=2S, then prove that

$\cos(S - A) + \cos(S - B) + \cos C = -1 + 4\cos\frac{S - A}{2}\cos\frac{S - B}{2}\cos\frac{C}{2}$

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26. Show that $\frac{1}{r^2}+\frac{1}{r_1^2}+\frac{1}{r_2^2}+\frac{1}{r_3^2}=\frac{a^2+b^2+c^2}{\Delta^2}$

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