MATHS

BOOKS - TELUGU ACADEMY MATHS (TELUGU ENGLISH)

IPE:MARCH-2019(TS)

Questions

1. IF $f(x) = 2x - 1, g(x) = \frac{x+1}{2}$ for all $x \in R$, find (gof) (x) and (fog) (x)

Watch Video Solution

2. Find the domain of the real valued function: $f(x) = \frac{1}{6x - x^2 - 5}$

Watch Video Solution

3. IF $A = \begin{bmatrix} 1 & 2 & 3 \\ 3 & 2 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & 2 & 1 \\ 1 & 2 & 3 \end{bmatrix}$, find 3B-2A

Watch Video Solution

4. IF $A = \begin{bmatrix} 2 & 0 & 1 \\ -1 & 1 & 5 \end{bmatrix}, B = \begin{bmatrix} -1 & 1 & 0 \\ 0 & 1 & -2 \end{bmatrix}$ then find $\left(AB^T\right)^T$

Watch Video Solution

5. IF

$\overline{OA} = \bar{i} + \bar{j} + \bar{k}, \overline{AB} = 3\bar{i} - 2\bar{j} + \bar{k}, \overline{BC} = \bar{i} + 2\bar{j} - 2\bar{k}, \overline{CD} = 2\bar{i} + \bar{j} +$

then find the vector $\overline{OD}$

Watch Video Solution

6. Let $\bar{a} = 2\bar{i} + 4\bar{j} - 5\bar{k}, \bar{b} = \bar{i} + \bar{j} + \bar{k}, \bar{c} = \bar{j} + 2\bar{k}$. Find the unit vector in the opposite direction of $\bar{a} + \bar{b} + \bar{c}$

Watch Video Solution

7. Find the equation of the plane passing through the point (3,-2,1) and perpendicular to the vector (4,7,-4)

Watch Video Solution

8. IF $\sin\theta = -\frac{1}{3}$ and θ does not lie in the 3^{rd} quadrant, find the value of $\cos\theta$ and $\cot\theta$

Watch Video Solution

9. Find the value of $\sin^2 82\frac{1}{2} - \sin^2 22\frac{1}{2}$.

Watch Video Solution

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

Watch Video Solution

11. If $A = \begin{bmatrix} 1 & -2 & 1 \\ 0 & 1 & -1 \\ 3 & -1 & 1 \end{bmatrix}$ then show that $A^3 - 3A^2 - A - 3I = O$, where I is unit matrix of order 3

Watch Video Solution

12. IF $\bar{a}, \bar{b}, \bar{c}$ are noncoplanar, find the point of intersection of the line passing through the points $2\bar{a} + 3\bar{b} - \bar{c}, 3\bar{a} + 4\bar{b} - 2\bar{c}$ with the line joining the points $\bar{a} - 2\bar{b} + 3\bar{c}, \bar{a} - 6\bar{b} + 6\bar{c}$

Watch Video Solution

13. IF $\bar{a} = 2\bar{i} + 3\bar{j} + 4\bar{k}, \bar{b} = \bar{i} + \bar{j} - \bar{k}, \bar{c} = \bar{i} - \bar{j} + \bar{k}$, compute $\bar{a}x\left(\bar{b}x\bar{c}\right)$ and verify that it is perpendicular to $\bar{a}$

Watch Video Solution

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

Watch Video Solution

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

Watch Video Solution

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

Watch Video Solution

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

Watch Video Solution

18. If $f: A \to B$ is a bijective function then prove that

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

Watch Video Solution

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

$$\left(1+\frac{3}{1}\right)\left(1+\frac{5}{4}\right)\left(1+\frac{7}{9}\right).....\left(1+\frac{2n+1}{n^2}\right) = (n+1)^2$$

Watch Video Solution

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

Watch Video Solution

21. Solve the equations $3x + 4y + 5z = 18, 2x + y + 8z = 13, 5x - 2y + 7z = 20$ by matrix

inversion method.

Watch Video Solution

22. If

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

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

Watch Video Solution

23. IF A,B,C are angles in the triangle, then prove that

$$\cos A + \cos B - \cos C = -1 + 4\cos\frac{A}{2}.\cos\frac{B}{2}.\sin\frac{C}{2}$$

Watch Video Solution

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

Watch Video Solution

Section A

1. IF $f(x) = 2x - 1, g(x) = \frac{x+1}{2}$ for all $x \in R$, find (fog) (x)

Watch Video Solution

2. Find the domain of the real valued function: $f(x) = \frac{1}{6x - x^2 - 5}$

Watch Video Solution

3. IF $A = \begin{bmatrix} 1 & 2 & 3 \\ 3 & 2 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & 2 & 1 \\ 1 & 2 & 3 \end{bmatrix}$, find 3B-2A

Watch Video Solution

4. IF $A = \begin{bmatrix} 2 & 0 & 1 \\ -1 & 1 & 5 \end{bmatrix}, B = \begin{bmatrix} -1 & 1 & 0 \\ 0 & 1 & -2 \end{bmatrix}$ then find $\left(AB^T\right)^T$

Watch Video Solution

5. IF

$\overline{OA} = \bar{i} - \bar{j} - \bar{k}, \overline{AB} = 2\bar{i} - 2\bar{j} - 4\bar{k}, \overline{BC} = 2\bar{i} - \bar{j} + 3\bar{k}, \overline{CD} = 3\bar{i} - \bar{j} -$

then find the vector $\overline{OD}$

Watch Video Solution

6. Let $\bar{a} = 2\bar{i} + 4\bar{j} - 5\bar{k}, \bar{b} = \bar{i} + \bar{j} + \bar{k}, \bar{c} = \bar{j} + 2\bar{k}$. Find the unit vector in the opposite direction of $\bar{a} + \bar{b} + \bar{c}$

Watch Video Solution

7. Find the equation of the plane passing through the point (3,-2,1) and perpendicular to the vector (4,7,-4)

Watch Video Solution

8. IF $\sin\theta = -\frac{1}{3}$ and θ does not lie in the 3^{rd} quadrant, find the value of $\sec\theta$,and $\cot\theta$.

Watch Video Solution

9. Find the value of $\sin^2 82\frac{1}{2} - \sin^2 22\frac{1}{2}$.

Watch Video Solution

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

Watch Video Solution

Section B

1. If $A = \begin{bmatrix} 1 & -2 & 1 \\ 0 & 1 & -1 \\ 3 & -1 & 1 \end{bmatrix}$ then show that $A^3 - 3A^2 - A - 3I = O$, where I is unit matrix of order 3

Watch Video Solution

2. IF $\bar{a}, \bar{b}, \bar{c}$ are noncoplanar, find the point of intersection of the line passing through the points $2\bar{a} + 3\bar{b} - \bar{c}, 3\bar{a} + 4\bar{b} - 2\bar{c}$ with the line joining the points $\bar{a} - 2\bar{b} + 3\bar{c}, \bar{a} - 6\bar{b} + 6\bar{c}$

Watch Video Solution

3. IF $\bar{a} = 2\bar{i} + 3\bar{j} + 4\bar{k}, \bar{b} = \bar{i} + \bar{j} - \bar{k}, \bar{c} = \bar{i} - \bar{j} + \bar{k},$ compute $\bar{a}x\left(\bar{b}x\bar{c}\right)$ and verify that it is perpendicular to $\bar{a}$

Watch Video Solution

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

Watch Video Solution

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

Watch Video Solution

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

Watch Video Solution

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

Watch Video Solution

Section C

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

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

Watch Video Solution

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

$$\left(1+\frac{3}{1}\right)\left(1+\frac{5}{4}\right)\left(1+\frac{7}{9}\right)\ldots\ldots.\left(1+\frac{2n+1}{n^2}\right)=(n+1)^2.$$

Watch Video Solution

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

Watch Video Solution

4. Solve the equations $3x+4y+5z=18, 2x+y+8z=13, 5x-2y+7z=20$ by matrix inversion method.

Watch Video Solution

5. If

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

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

Watch Video Solution

6. IF A,B,C are angles in the triangle, then prove that

$$\cos A + \cos B - \cos C = -1 + 4\cos\frac{A}{2}.\cos\frac{B}{2}.\sin\frac{C}{2}$$

Watch Video Solution

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

Watch Video Solution

Section A

1. Find the value of p, if the straight lines $3x + 7y - 1 = 0$ and $7x - py + 3 = 0$ are mutually perpendicular.

Watch Video Solution

2. IF $f(x) = \log(\tan e^x)$, then find f'(x).

Watch Video Solution

3. Find the ratio in which the XZ-plane divides line joining A(-2,3,4) and B(1,2,3)

Watch Video Solution

4. Reduce the equation $x + 2y - 3z - 6 = 0$ of the plane to the normal form.

Watch Video Solution

5. Evaluate $Lt_{x \to 0} \frac{\log(1+5x)}{x}$

Watch Video Solution

6. If $f(x) = 1 + x + x^2 + \ldots\ldots\ldots\ldots + x^{100}$, then find $f'(1)$.

Watch Video Solution

7. Find the angle which the straight line $y = \sqrt{3}x - 4$ makes with the Y-axis.

Watch Video Solution

8. Verify Rolle's theorem for the function $y = f(x) = x^2 + 4$on [-3,3]

Watch Video Solution

9. If y=cosx then find Δy and dy when $x = 60^\circ$ and $\Delta x = 1^\circ = 0.0174$ rad

Watch Video Solution

Section B

1. Check the continity of the following function at 2 .

$$f(x) = \begin{cases} \frac{1}{2}(x^2 - 4) & \text{if } 0 < x < 2 \\ 0 & \text{if } x = 2 \\ 2 - 8x^{-3} & \text{if } x > 2 \end{cases}$$

Watch Video Solution

2. $A(1, 2), B(2, -3), C(-2, 3)$ are 3 points. A point P moves such that $PA^2 + PB^2 = 2PC^2$. Show that the equation to the locus of P is 7 x - 7y + 4 = 0 .

Watch Video Solution

3. A straight line through $Q(\sqrt{3}, 2)$ makes an angle $\pi/6$ with positive direction of the X-axis. If the straight line intersects the line $\sqrt{3}x - 4y + 8 = 0$ at P, find the distance PQ.

Watch Video Solution

4. When the axes are rotated through an angle α, find the transformed equation of $x\cos\alpha + y\sin\alpha = p$.

Watch Video Solution

5. S.T the tangent at any point θ on the curve $x = c\sec\theta, y = c\tan\theta$ is $y\sin\theta = x - \cos\theta$.

Watch Video Solution

6. Find the derivative of $\cos^2 x$ from the first principle.

Watch Video Solution

7. A container in the shape of an inverted cone has height 12 cm and radius 6cm at the top. If it is filled with water at the rate of $12cm^3/\sec$, what is the rate of change in the rate of change in the height of water level when the tank is filled 8 cm?

Watch Video Solution

Section C

1. Find the orthocentre of the triangle whose vertices are $(5, -2), (-1, 2), (1, 4)$.

Watch Video Solution

2. Prove that the aea of the triangle formed by $y = x + c$ and the pair of lines $ax^2 + 2hxy = by^2 = 0$ is $\frac{e^2\sqrt{h^2 - ab}}{|a + b + 2h|}$ sq. units.

Watch Video Solution

3. Find the angle between the lines whose d.c's are related by $l+m+n=0 \& l^2+m^2-n^2=0$

Watch Video Solution

4. IF the tangent at a point on the curve $x^{2/3}+y^{2/3}=a^{2/3}$ intersects the coordinate axes in A and B then show that the length AB is a constant.

Watch Video Solution

5. Find the value if k , if the lines joining the origin with the points of intersection of the curve $2x^2-2xy+3y^2+2x-y-1=0$ and the x + 2y = k are mutually perpendicular .

Watch Video Solution

6. Find the maximum area of the rectangle that can be formed with fixed perimeter 20.

 Watch Video Solution