MATHS

BOOKS - TELUGU ACADEMY MATHS (TELUGU ENGLISH)

SOLVED MODEL PAPER - 4

Very Short Answer Questions

1. Find the value of k , if the straight lines $y - 3kx + 4 = 0$ and $(2k - 1)x + (8k - 1)y - 6 = 0$ are perpendicular.

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2. Find the equation of the straight line passing through the point $(-2, 4)$ and making intercepts ,whose sum is zero .

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3. Find the ratio in which the point $C(6, -17, -4)$ divides the line segment joining the points A (2, 3,4) and B (3 , -2 , 2) .

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

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5. Evaluate $\underset{x \to 0}{\text{Lt}} \dfrac{\cos ax - \cos bx}{x^2}$

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6. Compute $\underset{x \to \infty}{\text{Lt}} \left(\sqrt{x+1} - \sqrt{x}\right)$

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7. If $y = \log(\cosh 2x)$, then find $\frac{dy}{dx}$.

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8. Find the derivative of $\tan^{-1}\left(\frac{a-x}{1+ax}\right)$

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9. If $y = x^2 + x, x = 10, \Delta x = 0.1$, then find Δy and dy

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10. State Rolle's Theorem.

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Short Answer Questions

1. Find the equation of locus of P if $A = (4, 0), B(-4, 0)$ and $|PA - PB| = 4$

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2. When the axes rotated through an angegle $\frac{\pi}{4}$, find the transformed equation of $3x^2 + 10xy + 3y^2 = 9.$

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3. If the straight lines ax + by + c= 0 , bx +cy + a = 0 and cx +ay + b =0 are concurrent , then prove that $a^3 + b^3 + c^3 = 3abc$.

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4. If f is given by $f(x) = \begin{cases} k^2x - k & \text{if } x \geq 1 \\ 2 & \text{if } x < 1 \end{cases}$ is a continuous function on R, then find k .

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5. Find the derivative of sin2x from the first principles .

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6. Show that at any point (x,y) on the curve $y = b^{\frac{x}{a}}$, the length of the subtangent is a constant and the

length of the subnormal is $\frac{y^2}{a}$.

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7. A container is in the shape of an inverted cone has height 8m and radius 6m at the top. If it is filled with water at the rate of $2m^3$/minute, how fast is the height of water changing when the level is 4m?

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Long Answer Questions

1. Find the circumcentre of the triangle whose sides are given by $x + y + 2 = 0, 5x - y - 2 = 0$ and $x - 2y + 5 = 0$

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2. If $ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$ represents two parallel lines then prove that $h^2 = ab.$

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3. If $ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$ represents two parallel lines then prove that $af^2 = bg^2$.

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4. If $ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$ represents two parallel lines then prove that the distance between the parallel lines is $2\sqrt{\frac{g^2 - ac}{a(a+b)}}$ or $2\sqrt{\frac{f^2 - bc}{b(a+b)}}$.

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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 .

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6. If a line makes angles $\alpha, \beta, \lambda, \delta$ with the four diagonals of a cube, then show that $\cos^2\alpha + \cos^2\beta + \cos^2\lambda + \cos^2\delta = \frac{4}{3}$.

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7. Find the derivative $\frac{dy}{dx}$ of the function $y = \frac{(1-2x)^{2/3}(1+3x)^{-3/4}}{(1-6x)^{5/6}(1+7x)^{-6/7}}$.

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8. Find the angle between the curves $x + y + 2 = 0$ and $x^2 + y^2 - 10y = 0$

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9. A window is in the shape of a rectangle surmounted by a semi-circle. If the perimeter of the

window be 20 feet then find the maximum area.

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