MATHS

BOOKS - TELUGU ACADEMY MATHS (TELUGU ENGLISH)

IPE:MAY-2015(TS)

Section 1

1. Find the equation of the straight line passing through the point $(-2, 4)$ and

making intercepts whose sum is zero.

2. Find the value of p, if straight line

$$x + p = 0, y + 2 = 03x + 2y + 5 = 0 \quad \text{are}$$

concurrent.

3. Find the ratio in which the XZ-plane divides

the line joining A(-2,3,4) and B(1,2,3)

4. Find the direction cosines of the normal to

the plane $x + 2y + 2z - 4 = 0$

5. Compute $Lt_{x \to 0} \dfrac{e^{3x} - 1}{x}$.

6. Show that

$$Lt_{x \to 0} \frac{1 - \cos 2mx}{\sin^2 nx} \, (m, n \in z) = 2\left(\frac{m}{n}\right)^2$$

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7. Find the derivative of $(\sin x)^{\log x} + x^{\sin x}$.

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8. Find the derivative of $y = \sin^{-1}\left(\frac{2x}{1 + x^2}\right)$

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9. Find dy and $\triangle y$ of $y = x^2 + x$ at x=10 when $\triangle x = 0.1$.

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

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1. If the distance from 'P' to the points (2,3) and (2,-3) are in the ratio 2:3, then find the equation of the locus of P.

2. When the axes are rotated through an angle $45°$, the transformed equation of a curve is $17x^2 - 16xy + 17y^2 = 225$. Find the original equation of the curve.

3. Find the equation of the straight line passing through the points $(-1, 2)$ and $(5, -1)$ and also find the area of the triangle formed by it with the axes of coordinates.

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

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

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

6. Find the equation of tangent and normal to the curve $y = x^3 + 4x$ at (-1,3)

7. The volume of a cube is increasing at a rate of 9 cubie centimeters per second. How fast is the surface area increasing when the length of edge is 10 cms?

Section 3

1. Find the circumcenter of the triangle whose vertices are (-2,3) , (2 , -1) , (4 , 0) .

2. Show that the lines joining the origin to the points of intersection of the curve $x^2 + xy + y^2 + 3x + 3y - 2 = 0$ and the straight line $x - y - \sqrt{2} = 0$ are mutually perpendicular .

3. Find the direction cosines of the two lines which are connected by the relations l + m + n = 0 an mn - 2nl - 2lm = 0.

4. If

$$y = \tan(-1)\left(\frac{\sqrt{(1+x^2)} + \sqrt{1-x^2}}{\sqrt{1+x^2} - \sqrt{1-x^2}}\right)$$

then find $\dfrac{dy}{dx}$.

5. Find the length of subtangent subnormal at a pont t on the curve

$$x = a(\cos t + \sin t) \quad y = a(\sin t - t \cos t)$$

6. From a rectangular sheet of dimension $30cm \times 80cm$, four equal squares of side x cm. are removed at the corners, and the sieds are then turned up so as to form an open rectangular box.

Find the value of x, so that the volume of the box is the greatest.