



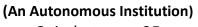
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DEPARTMENT OF MATHEMATICS UNIT - III APPLICATIONS OF DIFFERENTIAL CALCULUS

Centre of convature & concle of convature. Centre of curvature at any pt. on the curve. y = g(x) is $c(\bar{x}, \bar{y})$ where $\overline{x} = x - \frac{dy}{dx} \int [1 + (\frac{dy}{dx})^2]$ dey day $\overline{y} = y + \left[\frac{1 + \left(\frac{dy}{dx} \right)^2}{\frac{d^2 y}{dx^2}} \right]$ Circle of curvature at any point is $(\pi - \pi)^2 + (y - \bar{y})^2 = \rho^2$. where p is the radius of curvature. 1) Find the cycle of curvature at (c, e) on my = c². $\chi y = C^2$ Here $y_1 = -1$ & $y_2 = \frac{2}{c}$ $\rho = c\sqrt{2}$. to find a & y: $\overline{\chi} = \chi - \frac{dy}{dn} \frac{\left[1 + \frac{y_1^2}{y_2}\right]}{\frac{y_2}{y_2}} = \chi + \frac{\left[1 + 1\right]}{\frac{2}{y_2}}$ $= \chi + \frac{2}{2} = \chi + C$







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DEPARTMENT OF MATHEMATICS **UNIT - III APPLICATIONS OF DIFFERENTIAL CALCULUS**

 $\overline{y} = y + \left[\frac{1 + y^2}{y_2} \right] = y + \frac{1 + 1}{2} = y + c$ At (CIC) : N = C+C = 20 $\overline{y} = c + c = 2c$ Centre q cuivature $C(\tilde{x}, \tilde{y}) = C(2e, 2e)$ Circle of auvature $(\chi - \overline{\chi})^2 + (\gamma - \overline{\gamma})^2 = \rho^2$ $(n-2c)^{2}+(y-2c)^{2}=(c\sqrt{a})^{2}$ (2) y= 12 x at (3,6). Here 2y dy = 12. $dy = \frac{6}{y}$. At $(3, 6) \frac{dy}{dy} = 1$ $\frac{d^2y}{da^2} = -\frac{b}{y^2}$ $A + (3, 6) = -\frac{1}{6}$ $P = \frac{[1+1]^{3/2}}{-V_1} = -12\sqrt{2}$ (B) $P = 12\sqrt{2}$

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 $\bar{\chi} = \chi - y_1 [1+y_1^2] = \chi + 1 [1+1] = \chi + 12.$ At (3,6) 71-15 $\dot{y} = y + \frac{\Gamma(+y)^2}{y_2} = y + \frac{\Gamma(+1)}{-\gamma_6} = y - 12$ At (3, 6) = 4 = - 6 Centre q curvature $C(\bar{x}, \bar{y}) = C(15, -6)$ Câcle of curvature $(x-\overline{x})^2 + (y-\overline{y})^2 = \rho^2$ $(2-15)^{2}+(y+b)^{2}=(12\sqrt{a})^{2}$ 3 Vn+Vy= Va at (044,044) WHI $y_1 = -1 \otimes y_2 = \frac{4}{a}$ $P = \frac{\alpha}{\sqrt{2}}$ To find \$ & g : $\overline{\chi} = \chi - (-1) \overline{[1+1]} = \frac{\eta + \frac{\eta}{2}}{\frac{\eta}{\alpha}} = \frac{\chi + \frac{\eta}{2}}{\frac{\eta}{\alpha}}$ $At(\alpha_{14}, \alpha_{14}) \overline{\chi} = \frac{\eta}{4} + \frac{\eta}{2} = \frac{3\eta}{4}$

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| (y) $y = y + (1+1) = y + \frac{2}{4} = y + \frac{2}{4}$ |
|--|
| $A \neq (\alpha_{4}, \alpha_{4}), \overline{y} = \frac{3\alpha}{4}$ |
| Centre q cuevature $c(5i, j) = c(\frac{3a}{4}, \frac{3a}{4})$ |
| Circle q curvature $(\pi - \pi)^2 + (y - \bar{y})^2 = p^2$. |
| $\left(\eta - \frac{3a}{4}\right)^2 + \left(y - \frac{3a}{4}\right)^2 = \left(\frac{a}{\sqrt{2}}\right)^2$ |
| Find the centre & cuche of cuevature on |
| (4) xy = 12 at (3, 4) |
| (5) x3+ y3 = 3axy at (3a/2, 3a/2) |
| (6) $y = \chi^3$ at $(3, 27)$ |

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