37 19/ENG04/021 MAT104

HARUNA ODUNAYO JOSHUA Eleetbleet

(1) $y = \frac{(2x^2+3)}{\ln 2x}$

$\ln y = \ln(2x^2+3) - \ln(\ln 2x)$

$\frac{1}{y} \cdot \frac{dy}{dx} = \frac{1}{2x^2 3} \quad 4x \quad \frac{-1}{\ln 2x} \cdot \frac{\cancel{2}}{2x}$

$\frac{dy}{dx} = y\left(\frac{4x}{2x^2+3} - \frac{1}{x\ln 2x}\right)$

$\frac{dy}{dx} = \frac{(2x^2+3}{\ln 2x}\left(\frac{4x}{2x^2+3} - \frac{1}{x\ln 2x}\right)$

when $x = 2.5$

$\frac{dy}{dx} = \frac{2(2.5)^2+3}{\ln 2(2.5)}\left(\frac{4(2.5)}{2(2.5^2)+3} - \frac{1}{2.5\ln(2\times2.5)}\right)$

$= 3.92$ //

Scanned by TapScanner

(c) $y = \frac{2x}{x^2 - 5}$

$\ln y = \ln(2x) - \ln x^2 - 5$

$\frac{1}{y} \cdot \frac{dy}{dx} = \frac{1}{2x} \cdot 2 = \frac{1}{x^2 5} \cdot 2x$

$\frac{dy}{dx} = \frac{2}{2x} - \frac{2x}{x^2 - 5}$

$\frac{1}{y} \frac{dy}{dx} = \frac{1}{x} - \frac{2x}{x^2 - 5}$

$\frac{dy}{dx} = \frac{2x}{x^2 - 5} \left(\frac{1}{x} - \frac{2x}{x^2 - 5} \right)$

$\frac{dy}{dx} = A$

$A = \frac{2(2)}{2^2 - 5} \left(\frac{1}{2} - \frac{2(2)}{2^2 - 5} \right)$

$A = 4/_{-1} \left(1/2 - \left(\frac{4}{-1}\right) \right)$

$A = -4(0.5 + 4)$ $\quad A = -18$

Scanned by TapScanner

(c) $z = 2x^3 \ln y$. find $\frac{dz}{dy}$

$$\frac{dz}{dy} = 2x^3 \times \frac{1}{y}$$

$$\frac{dz}{dy} = \frac{2x^3}{y}$$

(d) $y = \cancel{x(2x^2+1)}$ $x(2x^2+1)^{1/2}$

let $u = 2x^2 + 1$

$$\frac{dy}{dx} = 4x$$

$$dx = \frac{dy}{4x}$$

$$\therefore \int_0^2 x\sqrt{2x^2+1}\,dx = \int_0^2 x\sqrt{u}\,\frac{dy}{4x} = \frac{1}{4}\int_0^2 \sqrt{u}\,du$$

$$\frac{1}{4}\,{}_{0}^{2}\left[\frac{u^{3/2}}{3/2}+c\right]$$

$$\frac{1}{4}\,{}_{0}^{2}\left[\frac{2(2x^2+1)^{3/2}}{3}\right]$$

$$\frac{1}{4}\left(\frac{2(2(2)^2+1)^{3/2}}{3}-\frac{2(2(0)^2+1)^{3/2}}{3}\right)$$

$$=\frac{1}{4}\left(\frac{52}{3}\right)=13/3$$