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COURSE MAT 104
MATRIC NO: 19/ENG02/015

1. $y = \frac{(2x^2+3)}{\ln 2x}$ at $x = 2.5$

let $u = 2x^2+3$ & $v = \ln 2x$

$$\frac{dy}{dx} = \frac{V\frac{du}{dx} - U\frac{dv}{dx}}{V^2}$$

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

$V = \ln 2x$, $\frac{dv}{dx} = \frac{1}{2x}$

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

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

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

at $x = 2.5$

$$= \frac{4(2.5)}{\ln 2(2.5)} - \frac{(2(2.5)^2+3)\frac{1}{2(2.5)}}{(\ln 2(2.5))^2}$$

$$= \frac{10}{\ln 5} - \frac{(12.5+3)\frac{1}{5}}{(\ln 5)^2}$$

$$= \frac{10}{\ln 5} - \frac{15.5 \times \frac{1}{5}}{(\ln 5)^2}$$

$$\frac{10}{\ln 5} - \frac{3.1}{(\ln 5)^2}$$

$$\frac{10}{1.6094} - \frac{3.1}{2.5903}$$

$= 6.2135 - 1.1968$

$\frac{dy}{dx} = 5.0167$

2 $y = 2x/(x^2-5)$ at point $(2, -4)$

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

Let $u = 2x$

$v = x^2-5$

$\frac{dy}{dx} = \frac{V\frac{du}{dx} - u\frac{dv}{dx}}{V^2}$

$\frac{du}{dx} = 2$

$\frac{dv}{dx} = 2x$

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

$\frac{dy}{dx} = \frac{2x^2-10-4x^2}{x^4-10x^2+25}$

at $x = 2$

$m = \frac{2(2)^2-10-4(2)^2}{(2)^4-10(2)^2+25}$

$= \frac{8-10-16}{16-40+25} = \frac{-81}{1}$

$= -18$ //

at $x = -4$

$m = \frac{2(-4)^2-10-4(-4)^2}{(-4)^4-10(-4)^2+25}$

$= \frac{32-10-64}{256-160+25} = \frac{-42}{121}$

$= -0.35$

$m_1 = -18 \& -0.35$

) $z = 2x^3 \ln y$

$\frac{dz}{dx} = 3 \frac{1}{y} 6x^2 \ln y$