MATHS 104

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

~~$y = \frac{(2(2.5)^2+3)}{\ln 2(2.5)} = 15.5$~~

$\frac{dy}{dx} = \frac{4x}{2(\frac{1}{2x})} = \frac{4x}{\frac{1}{x}} = 4x^2$?

$\therefore \frac{dy}{dx} = 4x^2$

$x = 2.5.$

$\frac{dy}{dx} = 25.0$

2. $y = \frac{2x}{(x^2-5)}$ at point $(2, -4)$.

$\therefore u = 2x$ $\frac{du}{dx} = 2$

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

$m = \frac{dy}{dx} = \frac{2(x^2-5) - 4x^2}{(x^2-5)^2}$

$m = \frac{dy}{dx} = \frac{2x^2-10-4x^2}{(x^2-5)^2}$

$m = \frac{dy}{dx} = \frac{-2x^2-10}{(x^2-5)^2}$ $x = 2$

$m = \frac{dy}{dx} = \frac{-2(2)^2-10}{(2^2-5)^2} = \frac{-18}{1}$

$m = -18$

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

$u = |2x|^3$ $\frac{d}{dt}$

$v = \ln y$

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

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

4. $\int_{2}^{0} x(2x^2+1)^{1/2}\,dx$

let $u = 2x^2+1$

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

$dx = \frac{1}{4x} \cdot du$

$= \int_{2}^{0} x\,u^{1/2}\,\frac{du}{4x}$

$= \frac{1}{4}\int u^{1/2}\,du$

$\frac{1}{4}\left(\frac{u^{3/2}}{3/2}\right)$

$\frac{1}{4}\left(\frac{2u^{3/2}}{3}\right)$

$\frac{2u^{3/2}}{12} = \frac{u^{3/2}}{6}$

$= \left[\frac{(2x^2+1)^{3/2}}{6}\right]_{2}^{0}$

$= 0 - \left(\frac{(2(2)^2+1)^{3/2}}{6}\right)$

$= 0 - \left(\frac{5^{3/2}}{6}\right)$

$= 0 - \left(\frac{11.18}{6}\right)$

$= 0 - 1.863$

$= -1.863.$