$$\frac{dy}{dx} = \frac{10}{1.6094} - \frac{3.1}{2.5902}$$

$$\frac{dy}{dx} = 6.2133 - 1.1967$$

$$\frac{dy}{dx} = 5.01657$$

$$\frac{dy}{dx} \approx 5.02 \text{ to } 3 \text{ s.f.}$$

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

$$y = \frac{2x}{x^2-5} \quad \begin{matrix} u \\ v \end{matrix}$$

$$\frac{dy}{dx} = \frac{v\,du/dx - u\,dv/dx}{v^2}$$

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

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

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

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

$m = dy/dx$ $\quad y-y_1=m(x-x_1)$

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

at $x=2$

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

$$m=\frac{8-10-16}{16-40+25}=\frac{-18}{1}$$

$m_1=-18$

at $x=-4$

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

$$\int_0^2 \frac{x^2}{2} \times \frac{(2x^2+1)^{3/2}}{3/2}$$

when $x = 2$

$$\frac{4}{2} \times \frac{(9)^{3/2}}{3/2}$$

$$2 \times \frac{27}{3/2}$$

$$2 \times 18$$
$$= 36$$

at $x = 0 \quad = 0$

upper bound − lower bound

$$= 36 - 0$$

$$\therefore \int_0^2 x(2x^2+1)\,dx$$

$$= 36.$$

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

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

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

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

$$m = -0.35$$

$m = -18$ and $m = -0.35$ //

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

$$\frac{dz}{dy} = 3.$$

$u = 2x^2 + 1$

$2x^2 = u - 1$

$x^2 = \frac{u-1}{2}$

$x = \sqrt{u-1/2}$

$\int x \cdot \sqrt{u} \cdot \frac{du}{2x}$

$\int_0^2 \sqrt{\frac{u-1}{2}} \cdot \sqrt{u} \cdot \frac{du}{2x}$

$\int_0^2 \sqrt{\frac{2x^2+1-1}{2}} \cdot \sqrt{2x^2+1} \cdot \frac{du}{4x}$

$\int_0^2 \sqrt{\frac{2x^2}{2}} \sqrt{2x^2+1} \cdot \frac{du}{2x}$

$\int_0^2 x = (2x^2+1)^{1/2}$