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

$$\frac{dy}{dx} \frac{[2x^2+3] \cdot \ln(2x) - (2x^2+3) \cdot \frac{d}{dx}[\ln(2x)]}{\ln^2(2x)}$$

$$= \frac{(2 \cdot \frac{d}{dx}[x^2] + \frac{d}{dx}|8|) \ln(2x) - (2x^2+3) \cdot \frac{1}{2}x \cdot \frac{d}{dx}[2x] \cdot}{\ln^2(2x]}$$

$$\frac{(2 \cdot 2x + 0) \ln(2x) - \frac{(2x^2+3) \cdot 2 \cdot \frac{d}{dx}(x)}{2x}}{\ln^2(2x)}$$

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

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

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

at $x = 2.5$

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

$$= 3.8198 \approx 3.82$$

(2) $\frac{d}{dx} \left[\frac{2x}{x^2-5}\right]$

$$= 2 \cdot \frac{d}{dx}\left[\frac{x}{x^2-5}\right]$$

$$= \frac{2 \cdot \frac{d}{dx}[x] \cdot (x^2-5) - x \cdot \frac{d}{dx}[x^2-5]}{(x^2-5)^2}$$

$$= \frac{2\left(1(x^2-5)\right) - \left(\frac{d}{dx}[x^2] + \frac{d}{dx}[-5]\right)x)}{(x^2-5)^2}$$

$$= 2\left[\frac{1(x^2-5) - \left(\frac{d}{dx}[x^2] + \frac{d}{dx}[-5]\right)x}{(x^2-5)^2}\right]$$

$$= \frac{2(x^2-(2x+0)x-5)}{(x^2-5)^2}$$

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

$$= \frac{-2(2)^2-10}{[(2)^2-5]^2}$$

$$= -18$$

$$\frac{1}{}$$

Coradient $= -18$ //

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

$u = 2x^3 \qquad v = \ln y$

$\frac{du}{dy} = 6x^2 \frac{dx}{dy} \qquad \frac{dv}{dy} = \frac{1}{y}$

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

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

(4) $\int_0^2 x(2x^2+1)^{1/2}\, dx$

Let $u = 2x^2 + 1$

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

$du = dx\, 4x$

$dx = du/4x$

$\int_0^2 u^{1/2} \cdot \frac{du}{4}$

$\frac{1}{4}\int_0^2 u^{1/2}\, du$

$$\frac{1}{4}\left[\frac{u^{3/2}}{3/2}\right]_0^2$$

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

$$= \frac{1}{6}\left[27 - 1\right]$$

$$= \frac{1}{6}\left[26\right]$$

$$= 4.333$$

$$\approx 4.33$$