Osamum Sarah 19/eng01/005
Bio medical Engineering

$dy/dx\ (x^2+3)/\ln(2x)$

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

$\dfrac{(\ln\ d/dx[2x] + d/dx[3])\ \ln(2x) - (2x^2+3)\ \ldots}{\ln^2(2x)}$

$\dfrac{(2\cdot 2x+0)\ln(2x) - (2x^2+3)\frac{1}{2x}\cdot d/dx[2x]}{\ln^2(2x)}$

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

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

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

at $x = 2.5$

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

$= 3.419\ldots - 3.82 + 0.358$

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

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

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

~~$= 2\ \dfrac{(1(x^2-5) - [x^2] + d/dx[-5])\,x)}{2(1(x^2-5)^2\ (d/dx[x^2] + d/dx[-5])\,x)}$~~

$2\ \dfrac{(1(x^2-5) - (d/dx[x^2] + d/dx[-5])\,x)}{(x^2-5)^2}$

$= 2\ \dfrac{(1(x^2-5) - (d/dx[x^2] + d/dx[-5])\,x)}{(x^2-5)^2}$

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

$\frac{d}{dx}[\ln(2x)]$

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

Gradient = -18

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

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

$dy/dx = 6x^2 \, dx/dy \quad dv/dy = 1/y$

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

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

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

let $u = 2x^2+1$

$dy/dx = 4x$

$du = dx \, 4x$

$dx = du/4x$

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

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

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

$= 1/6 [2(2)^2+1)^{3/2} - 2(0)+1)^{3/2})$

$= 1/6 [27 - 1]$

$= 1/6 [26)$

$= 4.333 = 4.33$