19/ENG06/062

S/N: 36

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MAT 104

① ~~ln2x~~ $y = \frac{(2x^2+3)}{\ln 2x}$

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

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

at $x = 2.5$

$$\frac{10.16 + 25 \times 0.9163 - 78.125 - 3}{5.6556}$$

$$= \frac{33.0075 - 81.125}{5.6556} = \frac{-48.1175}{5.6556}$$

$$= -8.5079$$

② $y = 2x/(x^2-5)$ Point $(2,-4)$

$$\frac{dy}{dx} = \frac{(x^2-5)2 - 2x(2x)}{x^4 - 10x^2 + 25}$$

$$\frac{dy}{dx} = \frac{-16 - 2x^2}{x^4 + 10x^2 + 25} = -\frac{2}{9}$$

m = gradient = $-2/9$

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

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

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

$$\cancel{\frac{dz}{dy}} = 3x^{-1}\frac{dz}{dy} + \frac{1}{y\ln y}$$

$$\cancel{\frac{-1}{y\ln y} = 3x^{-1} + 3x^{-1}}$$

$$3x^{-1}\frac{dz}{dy} = \frac{-1}{y\ln y}$$

$$\frac{dz}{dy} = \frac{\frac{-1}{y\ln y}}{3x^{-1}} = \frac{-1}{(3yx^{-1})\ln y}$$

(4) $\int_2^0 x(2x^2+1)^{1/2}$

$2x^2+1=t$

$\int t^{1/2}/4$

$1/4 \int t^{1/2} = 1/\cancel{4}_2 \times \frac{\cancel{2}t\sqrt{t}}{3}$

$= \frac{t\sqrt{t}}{6} = \frac{(2x^2+1)(\sqrt{2x^2+1})}{6}$

$\left[\frac{(2x^2+1)(\sqrt{2x^2+1})}{6}\right]_2^0$

$\frac{(2(0)^2+1)(\sqrt{2(0)^2+1})}{6} - \frac{(2(2)^2+1)(\sqrt{2(2)^2+1})}{6}$

$\frac{1}{6} - \frac{12}{6}$

$\frac{1}{6} - \frac{2}{1} = \frac{1-12}{6} = \frac{-11}{6}$