Carryover student

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18/ENG04/051
MATH104
200 LEVEL

$y = \frac{8x^2 \cos 8x}{e^{8x}}$

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

$u = 8x^2 \cos 8x$, $v = e^{8x}$

let $w = 8x^2$

$v = \cos 8x$ $\qquad \frac{dv}{dx} = 8e^{8x}$

using product rule

$w\frac{dv}{dx} + v\frac{dw}{dx}$

$\frac{dw}{dx} = 16x$, $\frac{dv}{dx} = \sin 8x$

$\therefore 7x^2 \times 8\sin 8x + \cos 8x \times 16x$

$= 56x^2 \sin 8x + 16x \cos 8x$

$\frac{du}{dx} = 16x(4x \sin 8x + \cos 8x)$

$\therefore \frac{v\frac{du}{dx} - u\frac{dv}{dx}}{v^2}$

$\frac{e^{8x}(56x^2 \sin 8x + 16x \cos 8x) - (7x^2 \cos 8x)(8e^{8x})}{(e^{8x})^2}$

$\frac{e^{8x} 56x^2 \sin 8x + e^{8x} 16x \cos 8x - e^{8x} 56x^2 \cos 8x}{(e^{8x})^2}$

$\frac{d}{dx} = \frac{8x(8\sin \sin 8x + 2x \cos 8x - 8x^2 \cos 8x)}{e^{8x}}$

3. $y = \cos(5x^2 + 6x)$, $\frac{dy}{dx}$

Let $u = 5x^2 + 6x$, $y = \cos u$

$\frac{du}{dx} = 10x + 6$ $\frac{dy}{du} = -\sin u$

$\frac{dy}{dx} = \frac{dy}{du} \times \frac{du}{dx}$, $-\sin u \times 10x + 6$

$-10x + 6 \sin(5x^2 + 6x)$.