19/ENG04/024 MATH04

IDIATA ANTHONY EHINOMEN

1) $y = \frac{2\cos 3x}{x^3}$

let $u = 2\cos 3x$ let $v = x^3$

$\frac{du}{dx} = -6\sin 3x$ $\frac{dv}{dx} = 3x^2$

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

$$= \frac{x^3 \cdot -6\sin 3x - 2\cos 3x \cdot 3x^2}{(x^3)^2}$$

$$= \frac{-6x^3\sin(3x) - 6x^2\cos(3x)}{x^6}$$

$$= -\frac{[6x^3\sin(3x) + 6x^2\cos(3x)]}{x^6}$$

$$= -\frac{6x^2[x\sin(3x) + \cos(3x)]}{x^{6-4}}$$

$$= -\frac{6(x\sin(3x) + \cos(3x))}{x^4}$$

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2) $y = xe^{2x}$

let $u = x$ $\quad v = e^{2x}$

$\frac{du}{dx} = 1$ $\quad \frac{dv}{dx} = 2e^{2x}$

$\frac{dy}{dx} = u\frac{dv}{dx} + v\frac{du}{dx}$

$= e^{2x} \cdot 1 + x \cdot 2e^{2x}$

$= e^{2x} + 2e^{2x}x$

3) Idiat a Anthony Ehinomen

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Electrical Electronics Engineering

4) ~~Find~~ $\int e^x \sin 2x \, dx$

$u = \sin 2x$ $\quad dv = e^x$

$du = 2\cos 2x$ $\quad v = e^x$

From $\Rightarrow \sin 2x \cdot e^x - \int e^x 2\cos 2x \, dx$

$u = \cos 2x$

$du = -2\sin$

$\Rightarrow \sin 2x \cdot e^x - 2\int e^x \cdot \cos 2x \, dx$

$\Rightarrow e^x \sin 2x - 2\int e^x \cos 2x \, dx$

$u = \cos 2x$ $\quad du = e^x$

$du = -2\sin 2x$ $\quad v = e^x$

$= e^x \sin 2x - 2[\cos 2x \cdot e^x - \int e^x \cdot (-2\sin 2x)\,dx]$

$= e^x \sin 2x - 2[e^x \cos 2x + 2\int e^x \sin 2x\,dx]$

$= e^x \sin 2x - 2e^x \cos 2x - 4\int e^x \sin 2x\,dx$

$\int e^x \sin 2x\,dx = e^x \sin 2x - 2e^x \cos 2x - 4\int e^x \sin 2x\,dx$

let $P = \int e^x \sin 2x\,dx$

$P = e^x \sin 2x - 2e^x \cos 2x - 4P$

$4P + P = e^x \sin 2x - 2e^x \cos 2x$

$5P = e^x \sin 2x - 2e^x \cos 2x$

$P = \dfrac{e^x \sin 2x - 2e^x \cos 2x}{5}$