

Abdulmaleek Tijjani Adedoye
 161EY6021002
 Computer Engineering

② $y = \frac{3e^{2x} \sin 2x}{x^{5/2}}$

$\ln y = \ln 3e^{2x} + \ln \sin 2x - \ln x^{5/2}$

$\frac{d}{dx} (\ln y) = \frac{d}{dx} (3e^{2x}) + \frac{d}{dx} (\ln \sin 2x) - \frac{d}{dx} (\ln x^{5/2})$

$\frac{1}{y} \frac{dy}{dx} = \frac{3e^{2x}}{3e^{2x}} + \frac{\cos 2x}{\sin 2x} - \frac{5/2 x^{3/2}}{x^{5/2}}$

multiply both sides by y

$\frac{dy}{dx} = \frac{3e^{2x} \sin 2x}{x^{5/2}} \left(1 + \frac{\cos 2x}{\sin 2x} - \frac{5/2 x^{3/2}}{x^{5/2}} \right)$

① Integralkan
 $\int 4 \sec^2 (3m+1) dm$

$u = 3m+1$

$du = 3 dm$

$dm = \frac{du}{3}$

$\int 4 \sec^2 u \frac{du}{3}$
 $\frac{4}{3} \int \sec^2 u du$

$\frac{4}{3} \tan u + C$

$\frac{4}{3} \tan (3m+1) + C$

② $\int 2t(3t^2-1)^{1/2} dt$

$u = 3t^2 - 1$

$\frac{du}{dt} = 6t$

$dt = \frac{du}{6t}$

$\int \frac{1}{3} \times u^{1/2} \frac{du}{6t^3} + C$

$\frac{1}{3} \times u^{1/2+1} + C$

$= \frac{1}{3} \times \frac{2}{3} u^{3/2} + C$

$= \frac{2}{9} u^{3/2} + C$

$= \frac{2}{9} (3t^2 - 1)^{3/2} + C$

$$(3) \int \frac{2x}{(4x^2-1)^{1/2}}$$

$$u = 4x^2 - 1$$

$$du = 8x dx$$

$$dx = \frac{du}{8x}$$

$$\int \frac{2x}{(u)^{1/2}} \cdot \frac{du}{8x}$$

$$= \frac{1}{4} \int u^{-1/2} du$$

$$= \frac{1}{4} \times u^{-1/2+1}$$

$$= \frac{1}{4} \times \frac{u^{-1/2+1}}{-1/2+1}$$

$$= \frac{1}{4} \times \frac{u^{1/2}}{1/2}$$

$$= \frac{1}{4} \times 2u^{1/2}$$

$$= \frac{1}{2} u^{1/2}$$

$$= \frac{1}{2} (4x^2-1)^{1/2} + C$$