Name: Shadrach Chukwuemeka michael

Dept: Electrical Electronics

matric no: 16/Eng04/040

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

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

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

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

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

multiply both sides by y

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

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

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

$u = 3m+1$

$du = 3dm$

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

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

$4/3 \int \sec^2 u\,du$

$4/3 \tan u + C$

$4/3 \tan(3m+1) + C$

2 $\int 2t(3t^2-1)^{1/2}$

$u = 3t^2 - 1$

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

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

$\int 2t(u)^{1/2} \frac{du}{6t}\ 3$

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

$\frac{1}{3}\int u^{1/2}\,du$

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

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

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

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

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

$u = 4x^2 - 1$

$du = 8x\,dx$

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

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

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

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

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

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

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

$$= 1/2 (4x^2 - 1)^{1/2} //$$