

MRS ONELAI

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COURSE: COMPUTER ENGINEERING

MAT NO: 19/ENG02/030

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

$$u = 3m + 1$$

$$du = 3 dm$$

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

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

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

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

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

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

$$u = 3t^2 - 1$$

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

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

continuation

$$\int \frac{1}{3} \times U^{1/2} du$$

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

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

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

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

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

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

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

$$du = 8x dx$$

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

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

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

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

continuation

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

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

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

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

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

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

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

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

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

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

$$\frac{5/2 x^{3/2}}{x^{5/2}}$$

$$1) \quad y = \frac{(x+1)^2 (x-2)^{1/2}}{(2x-1)(x-3)^{3/2}}$$

$$\ln y = [\ln(x+1)^2 + \ln(x-2)^{1/2}] -$$

$$[\ln(2x-1) + \ln(x-3)^{3/2}]$$

$$1/y \cdot dy/dx = \left[\frac{1}{(x+1)^2} \cdot 2(x+1) + \frac{1}{(x-2)^{1/2}} \right] -$$

$$- \left[\frac{1/2 \cdot 2x-1}{(2x-1)^2} + \frac{1}{(x-3)^{3/2}} \cdot \frac{3(x-3)^2}{2} \right]$$

$$1/y \cdot dy/dx = \left[\frac{2}{(x+1)^2} + \frac{(x-2)^{1/2}}{2(x-2)^{1/2}} \right] -$$

$$\left[\frac{2}{2x-1} + \frac{3(x-3)^{1/2}}{2(x-3)^{3/2}} \right]$$

$$1/y \cdot dy/dx = \left[\frac{2}{x+1} + \frac{1}{2(x-2)} \right] -$$

$$\left[\frac{2}{2x-1} + \frac{3}{2(x-3)} \right]$$

$$dy/dx = y \left[\frac{2}{x+1} + \frac{1}{2(x-2)} \right] -$$

$$- \frac{2}{2x-1} - \frac{3}{2(x-3)}$$

$$dy/dx = \frac{(x+1)^2 (x-2)^{1/2}}{(2x-1)(x-3)^{3/2}} \left[\frac{2}{x+1} + \frac{1}{2(x-2)} \right] -$$

$$- \frac{2}{2x-1} - \frac{3}{2(x-3)}$$