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ELECTRICAL ELECTRONICS ENGINEERING

19/ENG04/039

MAT 104 Assignment

Answers

Differentiation

$$1.) y = \frac{(2x+1)^2 (x-2)^{1/2}}{(2x-1) (x-3)^{4/3}}$$

$$\ln y = \ln[(2x+1)^2] + \ln[(x-2)^{1/2}] - \ln(2x-1) - \ln[(x-3)^{4/3}]$$

$$\frac{1}{y} \frac{dy}{dx} = \frac{1}{(x+1)^2} \cdot 2x+2 + \frac{1}{2} \frac{1}{(x-2)^{1/2}} - \frac{2}{2x-1} - \frac{4}{3} \frac{1}{(x-3)^{1/3}}$$

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

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

$$\frac{dy}{dx} = y \left[ \frac{2}{x+1} + \frac{1}{2} - \frac{2}{2x-1} - \frac{4}{3} \frac{1}{(x-3)^{1/3}} \right]$$

$$\frac{dy}{dx} = \frac{(2x+1)^2 (x-2)^{1/2}}{(2x-1) (x-3)^{4/3}} \left[ \frac{2}{x+1} + \frac{1}{2} - \frac{2}{2x-1} - \frac{4}{3} \frac{1}{(x-3)^{1/3}} \right]$$

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

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

$$\frac{1}{y} \frac{dy}{dk} = \frac{1}{3e^k} \cdot 3e^k + \frac{1}{\sin 2k} \cdot 2 \cos 2k - \frac{1}{k^{5/2}} \cdot 5k^{3/2}$$

$$\frac{1}{y} \frac{dy}{dk} = 1 + \frac{2 \cos 2k}{\sin 2k} - \frac{5k^{3/2}}{2k^{5/2}}$$

$$\frac{1}{y} \frac{dy}{dk} = 1 + 2 \tan 2k - \frac{5k^{3/2}}{2k^{5/2}}$$

$$\frac{dy}{dk} = y \left[ 1 + 2 \tan 2k - \frac{5k^{3/2}}{2k^{5/2}} \right]$$