Afolabi Paul Kehinde
Chemical Engineering
19/ENG01001
MAT 104 Assignment

Question 1

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

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

$$\frac{1}{y}\frac{dy}{dx} = \left(\frac{2}{x+1} + \frac{1}{2(x-2)}\right) - \left(\frac{2}{2x-1} + \frac{3}{2(x+3)}\right)$$

$$\frac{dy}{dx} = y\left(\frac{2}{x+1} + \frac{1}{2(x-2)} - \frac{2}{2x-1} - \frac{3}{2(x+3)}\right)$$

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

Question 2

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

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

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

$$\frac{1}{y}\cdot\frac{dy}{dx} = 1 + \frac{2\cos 2x}{\sin 2x} - \frac{5}{2x}$$

$$\frac{dy}{dx} = y\left[1 + \frac{2\cos 2x}{\sin 2x} - \frac{5}{2x}\right]$$

$$\frac{dy}{dx} = y\left[1 + \frac{2\cos 2x}{\sin 2x} - \frac{5}{2x}\right]$$

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