

Omarodon Oscarogie Yoma

Computer Engineering SIN: 65

MAT 104 Assignment

$$1) y = (2 \cos 3x) / x^3$$

$$\ln y = \ln 2 \cos 3x - \ln x^3$$

$$\frac{1}{y} \cdot \frac{dy}{dx} = \frac{1}{2 \cos 3x} \cdot (-6 \sin 3x) - \frac{1}{x^3} \cdot 3x^2$$

$$\frac{1}{y} \cdot \frac{dy}{dx} = \frac{-6 \sin 3x}{2 \cos 3x} - \frac{3x^2}{x^3}$$

$$\frac{dy}{dx} = y \left( \frac{-3 \sin 3x}{\cos 3x} - \frac{3}{x} \right)$$

$$\frac{dy}{dx} = \frac{2 \cos 3x}{x^3} \left( -3 \tan 3x - \frac{3}{x} \right)$$

$$2) y = x e^{2x}$$

$$u = x \quad v = e^{2x}$$

$$\frac{du}{dx} = 1 \quad \frac{dv}{dx} = 2e^{2x}$$

$$\frac{dy}{dx} = x \cdot 2e^{2x} + e^{2x} \cdot 1$$

$$= 2xe^{2x} + e^{2x}$$

$$\frac{d^2 y}{dx^2} = 4xe^{2x} + 2e^{2x} + 2e^{2x}$$
$$= 4xe^{2x} + 4e^{2x}$$

$$\frac{d^2 y}{dx^2} - 4 \frac{dy}{dx} + 4y = 0$$

$$(4xe^{2x} + 4e^{2x}) - 4(2xe^{2x} + e^{2x}) + 4(xe^{2x} + e^{2x})$$

$$4xe^{2x} + 4e^{2x} - 8xe^{2x} - 4e^{2x} + 4xe^{2x} + 4e^{2x}$$

$$8xe^{2x} - 8xe^{2x} + 4e^{2x} - 4e^{2x} = 0$$

$$\therefore \frac{d^2 y}{dx^2} - 4 \frac{dy}{dx} + 4y = 0$$

3) Omorodion Osasogie Yona  
Computer Engineering  
19 / EN602/051