

$$4 \int e^{2x} \sin x dx$$

$$u = \sin 2x$$

$$\frac{du}{dx} = 2 \cos 2x$$

$$du = 2 \cos 2x dx$$

$$dv = e^x$$

$$v = e^x$$

$$\begin{aligned} \int e^x \sin 2x dx &= e^x \sin 2x - \int 2e^x \cos 2x dx \\ &= e^x \sin 2x - \int 2e^x \cos 2x dx - \int 4e^x \sin 2x dx \\ &= e^x \sin 2x - \int 2e^x \cos 2x dx - 4 \int e^x \sin 2x dx \\ &= e^x \sin 2x - 2e^x \cos 2x - 4 \int e^x \sin 2x dx \end{aligned}$$

$$\text{let } I = \int e^x \sin 2x dx$$

$$I = e^x \sin 2x - 2e^x \cos 2x - 4I$$

$$I + 4I = e^x \sin 2x - 2e^x \cos 2x$$

$$5I = e^x \sin 2x - 2e^x \cos 2x$$

$$I = \frac{e^x \sin 2x - 2e^x \cos 2x}{5}$$

$$1 \quad \frac{y \frac{dy}{dx}}{dx} = \frac{\int \frac{dy}{dx}}{dx} \quad y = \frac{(2 \cos 3x)^{1/3}}{x^5}$$

$$x^3 (6 \sin 3x) = \frac{(2 \cos 3x)^{3/2}}{x^5}$$

$$\frac{dy}{dx} = \frac{x^3(-6 \sin 3x) - 3x(2 \cos 3x)^{3/2}}{x^5}$$

$$2 \quad y = x e^{2x}$$

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

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

$$\neq 4x^3 e^{2x} - 4(2x^2 e^{2x}) + 4x e^{2x} = 0$$

$$4x^3 e^{2x} - 8x^2 e^{2x} + 4x e^{2x} = 0$$

3 Kelvin Raymond Chimaronu

19/ENG061032

Mechanical Engineering