Integrating Factor

$$\frac{dy}{dx} = x^5 e^x + \frac{4y}{x}$$

$$e^{\frac{4}{x}}\left(\frac{dy}{dx} - \frac{4y}{x} = x^5 e^x\right)$$

$$\int \frac{dy}{dx} e^{4/x} - \frac{4y}{x} e^{4/x} \Rightarrow \int x^5 e^x \left(x^{-4}\right)$$

$$y e^{\frac{4}{x}} =$$

$$e^{-4\ln x}\left(\frac{dy}{dx} - \frac{4y}{x} = x^5 e^x\right) x^{-4}$$

$$\int$$

$$y x^{-4} = x e^x + C$$

$$y = x^5 e^x - \frac{e^x}{x^4} + \frac{C}{x^4}$$