

Homework 1

$$2.3 \quad 8, 14, 18, 22, 28, 29$$

$$2.2 \quad 7, 10, 16, 25, 27(a)$$

$$2.4 \quad 10, 15, 21, 25, 27(b), 33(a)$$

2.3

$$8) \quad \frac{dy}{dx} - y = e^{3x} \quad P(x) = -1$$

$$u = e^{-x}$$

$$\frac{dy}{dx} e^{-x} - e^{-x} y = e^{3x} e^{-x}$$

$$\frac{d}{dx} [e^{-x} y] = e^{3x} e^{-x}$$

$$\int \frac{d}{dx} [e^{-x} y] dx = \int e^{2x} dx = \frac{e^{2x}}{2} + C$$

$$e^{-x} y = \frac{e^{2x}}{2} + C$$

$$y = \frac{e^{3x}}{2} + C e^x$$

$$14) \quad x \frac{dy}{dx} + 3(y + x^2) = \frac{\sin x}{x} \quad \frac{dy}{dx} + \frac{3y}{x} = \frac{\sin x}{x^2} - 3x$$

$$P(x) = 3/x \quad u = e^{3 \ln x} = x^3$$

$$x^3 \frac{dy}{dx} + 3yx^2 = x \sin x - 3x^4$$

$$\frac{d}{dx} [x^3 y] = x \sin x - 3x^4$$

$$\int \frac{d}{dx} [x^3 y] dx = \int x \sin x dx - \int 3x^4 dx$$

$$x^3 y = \sin x - x \cos x - \frac{3x^5}{5} + C$$

$$y = \frac{\sin x}{x^3} - \frac{\cos x}{x^2} - \frac{3x^2}{5} + \frac{C}{x^3}$$