

$$18) \frac{dy}{dx} + 4y = e^{-x} \quad p(x) = 4 \quad m = e^{4x}$$

$$\frac{dy}{dx} e^{4x} + 4e^{4x} y = e^{3x}$$

$$\frac{d}{dx} \left[e^{4x} y \right] = e^{3x}$$

$$e^{4x} y = \frac{e^{3x}}{3} + C$$

$$y = \frac{e^{-x}}{3} + C e^{-4x}$$

$$y(0) = 1/3 + C = 4/3 \quad C = 1$$

$$y(x) = \frac{e^{-x}}{3} + C e^{-4x}$$

$$22) \frac{dy}{dx} + y \cot x = x \quad p(x) = \cot x \quad m = e^{\int \cot x} = \sin x$$

$$\frac{d}{dx} [\sin x y] = x \sin x$$

$$\sin x y = \sin x - x \cos x + C$$

$$y = 1 - \frac{x \cos x}{\sin x} + \frac{C}{\sin x}$$

$$y(\pi/2) = 1 - \pi/2 \cdot 0 + C = 1 + C = 2 \quad C = 1$$