

8.1, 8.2 # 7.

$$\begin{cases} \frac{dy}{dx} = xe^y \\ y(0) = 1 \end{cases}$$

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

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

$$-e^{-y} = \frac{1}{2}x^2 + C$$

$$y(0) = 1 \Rightarrow -e^{-1} = \frac{1}{2}(0)^2 + C \Rightarrow C = -\frac{1}{e}$$

$$-e^{-y} = \frac{1}{2}x^2 - \frac{1}{e}$$

$$e^{-y} = \frac{1}{e} - \frac{1}{2}x^2$$

$$-y = \ln\left(\frac{1}{e} - \frac{1}{2}x^2\right)$$

$$y = -\ln\left(\frac{1}{e} - \frac{1}{2}x^2\right)$$