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

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

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

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

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

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

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

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

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