

Section 3, Exercise 2

$$\frac{dx}{dt} = e^{-2t} \quad x(0) = 10$$

Analytic Solution

$$\int dx = \int e^{-2t} dt$$

$$x(t) = -\frac{1}{2}e^{-2t} + C$$

$$x(0) = 10$$

$$-\frac{1}{2} + C = 10$$

$$C = 10.5$$

$$x(t) = 10.5 - 0.5e^{-2t}$$

$$\text{as } t \rightarrow \infty \quad x \rightarrow 10.5 - 0.5 \frac{1}{e^{\infty}} = \underline{\underline{10.5}}$$

