Worksheet 13

Separable Equations & Population Models   MATH 2205, Fall 2018

1. Find the general solution to the differential equation $\dfrac{dy}{dx} = 3x^2y^2$

2. Find the solution to the initial value problem

$$y' = \frac{2x}{y + x^2 y}, \quad y(0) = -2$$

3. Consider

$$\frac{dP}{dt} = 0.04\left(1 - \frac{P}{1200}\right), \qquad p(0) = 60$$

(a) What is the carrying capacity? What is the value of k?

(b) Write the solution of the equation.

(c) What is the population after 10 weeks?

4. Consider

$$\frac{dP}{dt} = 0.02P - 0.0004P^2, \qquad p(0) = 40$$

(a) What is the carrying capacity? What is the value of k?

(b) Write the solution of the equation.

(c) What is the population after 10 weeks?