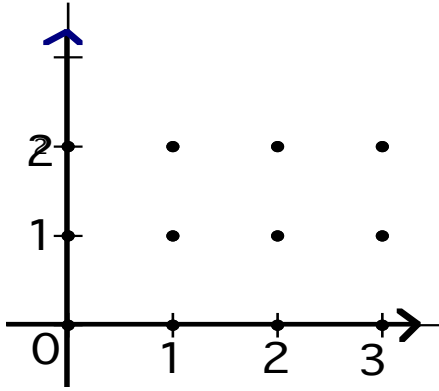


**CH.6 GQ / WS #2 Calculus BC**

Name \_\_\_\_\_ Per. \_\_\_\_\_

1) Given the differential equation  $\frac{dy}{dx} = \frac{xy}{3}$ .

a) Sketch a slope field for the given differential equation at the twelve points indicated.



c) Find the particular solution  $y = f(x)$  to the given differential equation with the initial condition  $f(0) = 1$ .

b) Given  $f(0) = 1$ , use Euler's Method to approximate the particular solution of this differential equation at  $x = 1$ . Use a step size of  $h = 0.5$ .

d) Use the particular solution found in part c to find  $f(1)$ .

2) Consider the separable differential equation  $\frac{dy}{dx} = (x - 2)(8 - y)$  with  $f(3) = 2$ .

Use Euler's Method, starting at  $t = 3$  with two steps of equal size, to approximate  $f(4)$ .

3) A radioactive element has a half-life of 100 years. How long will it take for the element to lose 22%?

4) Population of Fontana in 1980 was 100,000 and in 2008 the population was 190,000.

a) What is the growth rate?

b) What is the approximate population in 2020 at this rate of growth?

5) Find the particular solution of the differential equation  $\frac{dy}{dx} = \frac{2x}{y}$  with initial condition  $(4, -3)$ .

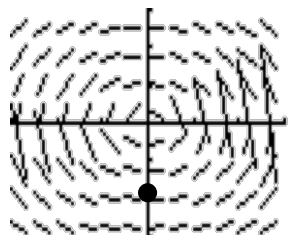
6) A population of elk is represented by the logistic differential equation  $\frac{dP}{dt} = \frac{P}{30} - \frac{P^2}{18000}$

- a) Find the value of  $k$  and the carrying capacity.  $k = \underline{\hspace{2cm}}$   $L = \underline{\hspace{2cm}}$
- b) The initial population is  $P(0) = 60$  elk.  $P(t) = \underline{\hspace{2cm}}$   
 Find a formula for the population in terms of  $t$ .  $\underline{\hspace{4cm}}$
- c) What is the elk population when the growth rate is at its maximum?  $P = \underline{\hspace{2cm}}$
- d) How long will it take for the elk population to reach 500?  $t = \underline{\hspace{2cm}}$
- e) What is the elk population after 12 years?  $P = \underline{\hspace{2cm}}$

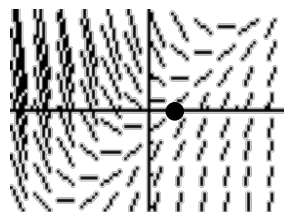
**MC:** 7) A conservation organization releases 20 wolves into a preserve. After 2 years, there are 35 wolves in the preserve. The preserve has a carrying capacity of 125. Determine the population after 4 years.

- a) 60                      b) 55                      c) 105                      d) 47                      e) 68

8a) Given  $\frac{dy}{dx} = \frac{-x}{y}$   
 Sketch the solution curve through the point  $(0, -2)$ .



b) Given  $\frac{dy}{dx} = x - y$   
 Sketch the solution curve through the point  $(1, 0)$ .



c) Given  $\frac{dy}{dx} = \frac{1}{2}x + 1$   
 Sketch the solution curve through the point  $(-3, 1)$ .

