1) Given $\dfrac{dy}{dx} = 3(8-y)$ with initial condition $(0,6)$.

    a) Find the particular solution
        of the differential equation.

    b) Use Euler's method with step size
        $h = 0.5$ to approximate $y(1)$.

    c) Use tangent line at $(0,6)$ to approximate $f(1)$.

    d) Find $y(1)$.

2) A population of elk is represented by the logistic differential equation $\dfrac{dP}{dt} = \dfrac{P}{20} - \dfrac{P^2}{10000}$

    a) Find the value of k and the carrying capacity. $k =$ _____ $L =$ _____

    b) The initial population is $P(0) = 100$ elk. $P(t) =$

         Find a formula for the population in terms of t.   _____

    c) What is the elk population when the growth rate is at its maximum? $P =$ _____

    d) How long will it take for the elk population to reach the amount in part *c*? $t =$ _____

    e) How long will it take for the elk population to reach 700? $t =$ _____

    f) What is the elk population after 75 years? $P =$ _____

3) A sadistic organization releases 300 foxes into a preserve. After 3 years, there are 250 foxes in the preserve.
     The preserve has a carrying capacity of 200.

    a) Write a logistic equation that models the population.

    b) What is the $\lim_{t \to \infty} P(t)$?

    c) What is the population after 10 years?

    d) What is the population after 25 years?