MATH 172 Fall, 2009 Quiz #7 Name:_____

For full credit you must show sufficient work to justify your answer.

1. Compute the equilibrium point (u^*, v^*) of the discrete model system

$$\begin{aligned} u_n &= 3u_{n-1} - 2v_{n-1} - 4 \\ v_n &= 5u_{n-1} - 3v_{n-1} - 28 \end{aligned}$$

2. Consider the following continuous model of a predator-prey system.

$$\begin{aligned} \frac{dV}{dt} &= 0.6V\left(1 - \frac{V}{100}\right) - 0.02VP = \left[0.6\left(1 - \frac{V}{100}\right) - 0.02P\right]V \\ \frac{dP}{dt} &= -0.4P + 0.005VP = (-0.4 + 0.005V)\,P \end{aligned}$$

   a. What kind of growth does the victim population exhibit if there are no predators (i.e., $P = 0$)? What kind of long term trend is there for the predator if there are no victims (i.e., $V = 0$)?
   b. Compute the equilibrium (V^*, P^*) other than (0,0) for the predator-prey system. Suggestion: find V^* first.