MATH 172   Fall, 2011   Quiz #8   Name:_____

Recall that the geometric series $\sum_{n=0}^{\infty} ar^n$ has a sum $S_\infty = a/(1-r)$ under a certain condition on r, which you should verify, and fails to exist otherwise.

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

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

2. A patient is given a 60 mg dose of a drug at regular intervals. In the time in between the drug declines to 15% of the amount present.
   a. At the time of the third dose (two time intervals) how much of the second dose remains?
   b. How much of the original dose remains?
   c. Including the third dose, how much drug is in the bloodstream?

   d. What is the long term amount of drug in the bloodstream assuming that the dose continues to be repeated?

   e. If 70 mg of the drug is neeeded to be effective, but above 75 mg is fatal, is this dosing pattern effective and safe?