Repeated Drug Doses Example – Digitalis

A doctor treating a patient who has had a heart attack may prescribe a medication, digitalis or digoxin, that helps the heart beat regularly. Digitalis is eliminated from a body at a rate proportional to the amount of digitalis in the body. The half-life of digitalis in a patient with good renal function is 1.5 - 2 days.

1. Model the elimination of a single dose of the digitalis as a geometric sequence. If you assume that half of a dose is still in the bloodstream after 2 days, what value of $r$ is associated with our model.

2. If 0.04 mg of digitalis is taken at the same time every morning, how many milligrams are in the body one week later, immediately after the person has taken his eighth dose?

3. The patient continues to take the drug for years. Approximate the level of drug in their system. Again, assume the measurement is taken immediately after the dose is taken.