Homework 16: Differential Equations Part III (due April 29)

1. Consider the following situation: Nicotine leaves the body at a rate proportional to the amount present with the constant of proportionality 0.347 if the amount of nicotine is in mg and time is in hours. The amount of nicotine in the body immediately after consumption is 0.4 mg.

(a) Define the variables

(b) Write a differential equation to describe the relationship.

(c) Solve the differential equation.

2. Warfarin is a drug used as an anticoagulant. After administration of the drug is stopped, the quantity remaining in a patient's body decreases at a rate proportional to the quantity remaining. The half-life of warfarin in the body is 37 hours.

(a) Write a differential satisfied by Q, the quantity of warfarin in a patient's body as a function of time.

(b) How many days does it take for the drug level in the body to be reduced to 25% of the original level?