

**Class Drill 9a: Rate of Change Problem (Exponential Function)**

A drug is administered by injection. The drug concentration (in milligrams per liter) in the bloodstream  $t$  hours after the injection is given by the formula

$$c(t) = 3e^{\left(-\frac{t}{2}\right)} \text{ for } 0 \leq t$$

(A) Find the concentration after 1 hours and after 4 hours. (Give an exact answer in symbols and then approximate answer in decimals. Include units in your answer.)

(B) Find the rate of change of the concentration after 1 hours. (Give an exact answer in symbols and then approximate answer in decimals. Include units in your answer.)

(C) Find the rate of change of the concentration after 4 hours. (Give an exact answer in symbols and then approximate answer in decimals. Include units in your answer.)

(D) Find the average rate of change of the concentration from 1 to 4 hours. (Give an exact answer in symbols and then approximate answer in decimals. Include units in your answer.)

(E) A graph of the concentration is shown below. Illustrate each of the quantities found in questions (A) – (D) on the graph.

