

Quiz 5

MATH 139-02
Thursday, February 4, 2004

1. A 12-gram sample of a radioactive substance decays at the rate of 5% per day.

(a) Find a formula that gives the amount A of the substance remaining after t days.

Solution: We have several choices, but the simplest is probably $A(t) = 12(0.95)^t$.

(b) How much of the substance remains after 10 days?

Solution: $A(10) = 12(0.95)^{10} \approx 7.185$ grams.

(c) What is the half-life of this substance?

Solution: We need to solve the equation $12(0.95)^t = 6$ for t (since 6 grams is half of the original 12). We get $(0.95)^t = 0.5$, so $t \ln(0.95) = \ln(0.5)$ and $t = \frac{\ln(0.5)}{\ln(0.95)} \approx 13.5$ days.