Mathematics 172

Quiz 7 **Name:** Key

You must show your work to get full credit.

1. For the initial value problem $\frac{dP}{dt} = .12P$, $P(0) = 55$

(a) Give a formula for $P(t)$ $P(t) =$ $55e^{.12t}$

(b) What is the doubling time? Doubling time is 5.776

Solve $P(t) = 55e^{.12t} = 2(55)$

$e^{.12t} = 2$

$.12t = \ln(2)$

$t = \ln(2)/.12 = 5.776$

2. For the initial value problem $A' = -.3A$, $A(0) = 9.2$

(a) Give a formula for $A(t)$. $A(t) =$ $9.2e^{-.3t}$

(b) What is the half life of A? Half life is 2.310

Solve $A(t) = 9.2e^{-.3t} = \frac{1}{2}(9.2)$

$e^{-.3t} = .5$

$-.3t = \ln(.5)$

$t = \ln(.5)/(-.3) = 2.310$

(c) How long unit there is only 10% of the initial amount?

Solve $A(t) = 9.2e^{-.3t} = (.1)9.2$ $t =$ 7.675

$e^{-.3t} = .1$

$-.3t = \ln(.1)$

$t = \ln(.1)/(-.3) = 7.675$