Mathematics 172

Quiz 2 Name: Key

You must show your work to get full credit.

1. If

$$\frac{dN}{dt} = -.9N$$

find the half life of N. The half life is .7702

$N(t) = N_0 e^{rt} = N_0 e^{-.9t}$

To find the half life solve

$N(t) = N_0 e^{-.9t} = \frac{1}{2} N_0$

$e^{-.9t} = .5$

$-.9t = \ln(.5)$

$t = \ln(.5)/-.9 = .7702$

2. Let r be a constant and assume that

$$P' = rP \qquad P(0) = 100, \qquad P(4) = 115.$$

Find r and $P(20)$. $r =$ .03494

$P(t) = P_0 e^{rt} = 100 e^{rt}$

to find r use

$P(4) = 100 e^{4r} = 115$

$e^{4r} = 115/100$

$4r = \ln(115/100)$

$r = \ln(115/100)/4 = .03494$

$P(20) =$ 201.1

Thus

$P(t) = 100 e^{.03494 t}$

and so

$P(20) = 100 e^{.03494(20)}$

$= 201.1$