Mathematics 122 Quiz 6 Name: Key

(1) Solve $4.3(1.4)^t = 62.1$ for t.

1 pt

$(1.4)^t = \frac{62.1}{4.3}$

$t \ln(1.4) = \ln(62.1/4.3)$

$t = \frac{\ln(62.1/4.3)}{\ln(1.4)}$

$t =$ 7.93566..

(2) If a population grows by the formula $P(t) = 6.1(1.78)^t$ how long does it take to double?

2 pts

Solve

$P(t) = 2P(0)$

i.e.

$6.1(1.76)^t = 2(6.1)$

$t \ln(1.76) = \ln(2)$

$t = \frac{\ln(2)}{\ln(1.76)}$

Doubling time = 1.226128..

(3) A radio substance decays so that the amount left after t years is $P_0 e^{-.03t}$ where P_0 is the initial amount. What is the half life?

2 pts

Solve

$P(t) = \frac{1}{2}P(0)$

i.e.

$P_0 e^{-.03t} = \frac{1}{2}P_0$

$e^{-.03t} = \frac{1}{2} = .5$

$\ln(e^{-.03t}) = \ln(.5)$

$-.03t = \ln(.5)$

$t = \frac{\ln(.5)}{-.03}$

Half life = 23.1049..