Mathematics 172

Quiz 10 **Name:** Key

You must show your work to get full credit.

1. If a population is modeled by

$$P_{t+1} = 1.2P_t \qquad \text{and} \qquad P_0 = 100$$

(a) What is a formula for P_t? $P_t =$ $100(1.2)^t$

The solution to
$P_{t+1} = \lambda P_t$
is $P_t = P_0 \lambda^t$

In our case $\Rightarrow$ This is
$P_t = 100(1.2)^t$

(b) How long until the population reaches 1,000? $t =$ 12.629

Solve
$P_t = 100(1.2)^t = 1{,}000$
$(1.2)^t = \frac{1000}{100} = 10$
$t \ln(1.2) = \ln(10)$
$t = \ln(10)/\ln(1.2) = 12.629$

2. If N_t satisfies

$$N_{t+1} = 1.1N_1 + 2 \qquad \text{and} \qquad N_0 = 20$$

compute the following

$N_1 =$ 24

$N_2 =$ 28.4

$N_3 =$ 33.24

$N_1 = 1.1(N_0) + 2$
$= 1.1(20) = 24$

$N_2 = 1.1(N_1) + 2$
$= 1.1(24) + 2 = 28.4$

$N_3 = 1.1(28.4) + 2$
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