Mathematics 172

Quiz 1

Name: Key

You must show your work to get full credit.

1. If $N_{t+1} = 1.2N_t$ and $N_0 = 5$ find N_t for $t = 0, 1, 2, 3, 4$.

$N_0 =$ 5.000

$N_1 =$ 6.000

$N_2 =$ 7.200

$N_3 =$ 8.640

$N_4 =$ 10.368

We know that if

$N_{t+1} = \lambda N_t$ then

$N_t = N_0 \lambda^t$

In our case this is

$N_t = 5(1.2)^t$

Use your calculator to compute

N_0, N_1, N_2, N_3, N_4

2. If a population grows by the model $P_{t+1} = 1.5P_t$ and $P_0 = 10$ how long until does it take the population to size to reach 10,000?

$t =$ 17.04

Here $P_t = P_0 \lambda^t$

$= 10(1.5)^t$

We want to solve

$P_t = 10,000$

That is

$10(1.5)^t = 10,000$

$(1.5)^t = \frac{10,000}{10} = 1,000$

$t \ln(1.5) = \ln(1000)$

$t = \frac{\ln(1000)}{\ln(1.5)} = 17.04$