Mathematics 172

Quiz 8 Name: Key

You must show your work to get full credit.

A group 13 annual cicadas get blown by a storm onto an island that has no cicadas. Ten years later there are 73 cicadas on the island.

1. What is per capita growth rate of the cicadas population?

$P_t = P_0 \lambda^t = 13\lambda^t$.

$r =$ .1883

We know

$P_{10} = 13\lambda^{10} = 73$

$\lambda^{10} = 73/13$

$\lambda = (73/13)^{(1/10)} = 1.1883$

So $r = \lambda - 1 = .1883$

2. How long until the cicadas population reaches 1,000?

Solve

Time to a thousand cicadas: 25.172 or round up to 26.

$P_t = 13(1.1883)^t = 1,000$

$(1.1883)^t = 1000/13$

$t \ln(1.1883) = \ln(1000/13)$

$t = \ln(1000/13)/\ln(1.1883)$

$= 25.172$