232 Quiz 2

January 27, 2012

Name: _____

Name: * key *

Name: _____

Work in groups (same ones as last time). You may use your Notebooks.

1. (number 49 from 5.4) Dr. Drosophila is breeding fruit flies in his laboratory. He started with 600 fruit flies, and after three days there were already 840 fruit flies in Dr. Drosophila's laboratory. Assume that the fruit fly population grows at a rate proportional to the number of fruit flies in the laboratory.

How long will it take for the fruit fly population to double?

Show all work clearly and in order to explain your reasoning.

$Q(0) = 600 = Q_0$

$Q(3) = 840$

$Q(t) = Q_0 e^{kt}$

$Q(t) = 600 e^{kt}$

$840 = 600 e^{k(3)}$

$\frac{840}{600} = e^{3k}$

$\ln\left(\frac{840}{600}\right) = 3k$

$k = \frac{\ln(840/600)}{3}$

so $Q(t) = 600 e^{\frac{\ln(840/600)}{3} t}$

answer the question:

solve $Q(t) = 1200$

$600 e^{\frac{\ln(840/600)}{3} t} = 1200$

$e^{\frac{\ln(840/600)}{3} t} = 2$

$\frac{\ln(840/600)}{3} t = \ln 2$

after $\boxed{t = \frac{3 \ln 2}{\ln(840/600)}}$ days.