

5.8/5.9 Practice #2

Advanced Pre-Calculus

1. 750 grams of a certain radioactive material decays to 500 grams in 3 days. Find how long it would take to become 300 grams.
2. A culture of 35 bacteria increases to 45 bacteria in 3 hours. How long would it take to become 110 bacteria?
3. A lasagna is removed from an oven when its temperature is 450°F in a room with a constant temperature of 70 °F. It takes 8 minutes for it to reach 400 °F. How long will it take for the lasagna to cool down to 175 °F?
4. The following data represent crime rate against individuals (crimes per 1000 households) and their income (in dollars) in the United States in 2007.

- a. Use the graphing calculator to make a scatter plot of the data and sketch it here.

Income	Crime Rate
5000	213.1
11,250	201.3
20,000	167.0
30,000	154.6
52,500	151.2
62,500	144.6

- b. Using a graphing utility, build a logarithmic model from the data.
- c. Use your model to predict the crime rate of a household whose income is \$55,000.

5. The logistic model $W(t) = \frac{14,656,248}{1 + 0.059e^{0.057t}}$ represents the number of farm workers in the United States t years after 1910.
- How many workers were there initially? Round to the nearest person.
 - What is the limiting size for the number of farm workers in the United States?
 - How many farm workers were there in the United States in 2010?
 - When did the number of farm workers in the United States reach 10,000?