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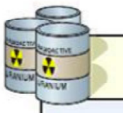
pgs 343-344:

3. Chemistry A chemist has a 100-gram sample of a radioactive material. He records the amount of radioactive material every week for 7 weeks and obtains the following data:



Week	Weight (in Grams)
0	100.0
1	88.3
2	75.9
3	69.4
4	59.1
5	51.8
6	45.5

(a) Using a graphing utility, draw a scatter diagram with week as the independent variable.
(b) Using a graphing utility, build an exponential model from the data.
(c) Express the function found in part (b) in the form $A(t) = A_0 e^{kt}$.
(d) Graph the exponential function found in part (b) or (c) on the scatter diagram.
(e) From the result found in part (b), determine the half-life of the radioactive material.
(f) How much radioactive material will be left after 50 weeks?
(g) When will there be 20 grams of radioactive material?

6. Economics and Marketing The following data represent the price and quantity supplied in 2009 for Dell personal computers.

Price ($/Computer)	Quantity Supplied
2300	180
2000	173
1700	160
1500	150
1300	137
1200	130
1000	113

(a) Using a graphing utility, draw a scatter diagram of the data with price as the dependent variable.
(b) Using a graphing utility, build a logarithmic model from the data.
(c) Using a graphing utility, draw the logarithmic function found in part (b) on the scatter diagram.
(d) Use the function found in part (b) to predict the number of Dell personal computers that will be supplied if the price is $1650.

8. Population Model The following data represent the world population. An ecologist is interested in building a model that describes the world population.

Year	Population (in Billions)
2001	6.17
2002	6.25
2003	6.32
2004	6.40
2005	6.48
2006	6.55
2007	6.63
2008	6.71
2009	6.79
2010	6.85

Source: U.S. Census Bureau

(a) Using a graphing utility, draw a scatter diagram of the data using years since 2000 as the independent variable and population as the dependent variable.
(b) Using a graphing utility, build a logistic model from the data.
(c) Using a graphing utility, draw the function found in part (b) on the scatter diagram.
(d) Based on the function found in part (b), what is the carrying capacity of the world?
(e) Use the function found in part (b) to predict the population of the world in 2015.
(f) When will world population be 10 billion?

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21. A 50-mg sample of a radioactive substance decays to 34 mg after 30 days. How long will it take for there to be 2 mg remaining?

22. (a) If $1000 is invested at 5% compounded monthly, how much is there after 8 months?
(b) If you want to have $1000 in 9 months, how much do you need to place in a savings account now that pays 5% compounded quarterly?
(c) How long does it take to double your money if you can invest it at 6% compounded annually?

5.8/5.9 Practice **Advanced Pre-Calculus**

1. 500 grams of a certain radioactive material decays to 450 grams in 1000 years. Find how long it would take to become 250 grams (in other words, find the half-life).

2. In exercise 1, find the amount left after 2000 years.

3. A typical nuclear power plant produces about 10 pounds of Krypton-85 per year. The half-life of Krypton-85 is 11 years. How long must the Krypton-85 be contained so that only 0.1 pounds remain?

4. A culture of 300 bacteria increases to 2000 bacteria in 36 hours. How long would it take to become 600 bacteria (in other words, what is it's doubling time)?

5. A culture of 450 bacteria increases to 3000 bacteria in 4 days. How much bacteria would be present after 7 days?

6. A cake is removed from an oven when its temperature is 375ºF in a room with a constant temperature of 72 ºF. It takes 5 minutes for it to reach 345 ºF. How long will it take for the cake to cool down to 150 ºF?