Chapter 8 Applications

1. **Multiple Choice** The population of Texas in 2000 was about 20.852 million people. The function $p(n) = 20.852(1.02071)^n$ estimates the population where $n = 0$ corresponds to the year 2000. Which is a reasonable estimate in millions of the population of Texas in 2020?

   (A) 21.284 (B) 31.420 (C) 41.740 (D) 49.842

2. **Ecology** In 50 days, a water hyacinth can generate 1000 offspring (the number of plants is multiplied by 1000). (you will start with 1)

   a. How many hyacinth plants could there be after 150 days?

   b. How many hyacinth plants could there be after 200 days?

   c. Write a function to model the situation.

3. A population of 6000 doubles in size every 10 years. Which equation relates the size of the population y to the number of 10-year periods x?

   F. $y = 6000 \cdot 10^x$ G. $y = 10 \cdot 2^x$

   H. $y = 6000 \cdot 2^x$ J. $y = 2 \cdot 100^x$

4. **Biology** A certain species of bacteria in a laboratory culture begins with 75 cells and doubles in number every 20 min.

   a. Write a function to model the situation.

   b. How many will there be in 80 minutes?

   c) How many will there be 2 hours?

5. Your science class is collecting cans. You start with 150 cans. Your collection triples every week. How many cans will you have collected after 7 wk? What was the function?

6. **Medical Care** Since 1995, the daily cost of patient care in community hospitals in the United States has increased about 4% per year. In 1995, such hospital costs were an average of $968 per day.

   a. Write an equation to model the cost of hospital care since 1995.

   b. Use your equation to estimate the approximate cost per day in 2010.

7. **a.** Suppose your community has 4512 students this year. The student population is growing 2.5% each year. Write an equation to model the student population.

   b. What will the student population be in 3 years?

8. **Milk Consumption** Since 1980, the number of gallons of whole milk each person in the United States drinks each year has decreased 4.1% each year. In 1980, each person drank an average of 16.5 gallons of whole milk per year.

   a. Write an equation to model the gallons of whole milk drunk per person.

   b. Use your equation to find the approximate consumption per person of whole milk in 2000.

9. **Statistics** In 1990, the population of Washington, D.C., was about 604,000 people. Since then the population has decreased about 1.8% per year.
   a. What is the initial number of people?
   b. What is the decay factor?
   c. Write an equation to model the population of Washington, D.C., since 1990.
   d. Suppose the current trend in population change continues. Predict the population of Washington, D.C., in 2010.

10. **FINANCE** You deposit $2000 in a bank account. Find the balance after 4 years for each of the following situations. (Review 8.1 for 8.3)

   a. The account pays 7% annual interest compounded quarterly.

   b. The account pays 5% annual interest compounded monthly.

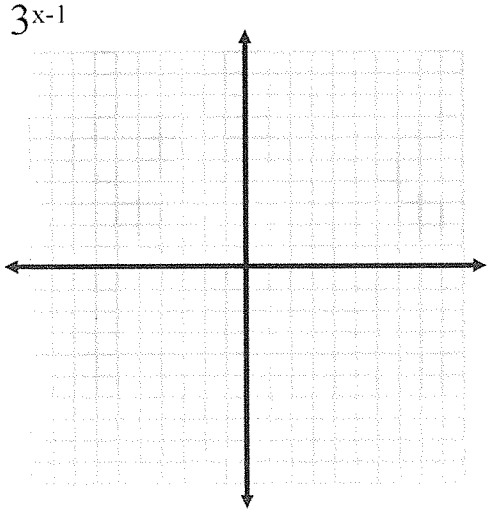
11. $20,000 deposit earning 3.5% compounded quarterly, after 10 years

12. $4000 principal earning 6% compounded annually, after 5 years

Graph the following.

13. $y = 3^{x-1}$

x	y
-2	
-1	
0	
1	
2	



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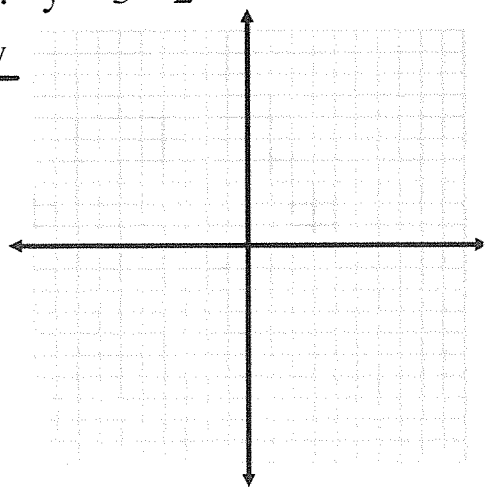
14. $y = 3^x - 2$

x	y
-2	
-1	
0	
1	
2	



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