

# Practice 8-1

## Exploring Exponential Models

Without graphing, determine whether each equation represents exponential growth or exponential decay.

1.  $y = 72(1.6)^x$  **G**      2.  $y = 24(0.8)^x$  **D**      3.  $y = 3\left(\frac{6}{5}\right)^x$  **G**      4.  $y = 7\left(\frac{2}{3}\right)^x$  **D**

Sketch the graph of each function. Identify the horizontal asymptote.

5. A new truck that sells for \$29,000 depreciates 12% each year. Write a function that models the value of the truck. Find the value of the truck after 7 yr.  
 $29,000(.88)^x$       \$11,851.59
6. The bear population increases at a rate of 2% per year. There are 1573 bear this year. Write a function that models the bear population. How many bears will there be in 10 yr?  
 $1,573(1.02)^x$       1917
7. An investment of \$75,000 increases at a rate of 12.5% per year. Find the value of the investment after 30 yr.  
 $75,000(1.125)^x$       2,568,247.87
8. The population of an endangered bird is decreasing at a rate of 0.75% per year. There are currently about 200,000 of these birds. Write a function that models the bird population. How many birds will there be in 100 yr?  
 $200,000(.9925)^x$       94206

Write an exponential function  $y = ab^x$  for a graph that includes the given points.

9.  $(0, 2), (1, 1.3)$       10.  $(1, 0.84), (2, 1.008)$   
 $2(.65)^x$        $.7(1.2)^x$

For each annual rate of change, find the corresponding growth or decay factor.

11. +45%      12. -10%      13. +200%  
 1.45      .9      3

For each function, find the annual percent increase or decrease that the function models.

14.  $y = 1700(0.75)^x$       15.  $y = 984.5(1.73)^x$   
 -25%      +73%
16. The value of a piece of equipment has a decay factor of 0.80 per year. After 5 yr, the equipment is worth \$98,304. What was the original value of the equipment?  
 300,000

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# Homework: Models of Exponential Functions

For #s 1 – 4, use the information given in the following table.

Earthquake Location	Year	Richter Scale Measure
New Madrid, Missouri	1812	7.9
San Francisco, California	1906	7.7
Valdivia, Chile	1960	9.5
Prince William Sound, Alaska	1964	9.2
Kobe, Japan	1995	6.9
Charlottesville, Virginia	2001	3.2

1. How many times more energy was released by the earthquake in New Madrid than the earthquake in Charlottesville?

$$8,759,310.01$$

2. Compare the energy of the earthquake in Chile with the one in Japan.

$$6926.52$$

3. Hg-197 is used in kidney scans. It has a half-life of 64.128 hours. Write the exponential decay function for a 12-mg sample. Find the amount remaining after 72 hours.

$$5.51 \text{ mg}$$

4. Sr-85 is used in bone scans. It has a half-life of 64.9 days. Write the exponential decay function for a 8-mg sample. Find the amount remaining after 100 days.

$$2.75 \text{ mg}$$

5. Suppose you invest \$5000 in an account earning 6.9%, compounded monthly. How much will be in the account after 30 years?

$$\$39,389.90$$

6. If you put \$100 into an account earning 2.5% compounded continuously, how much will be in the account after 10 years?

$$\$128.40$$

7. If you have \$1500 to put into an account earning 5.6%, and you plan to leave it there for 15 years, would it be better to have the interest compounded continuously, or compounded quarterly? Why?

continuous, you make more

8. You want to save \$500 for a new iPad in 2 years. How much should be put into an account that earns 5.2% annual interest, compounded continuously?

$$\$450.61$$

9. How long would it take to double your principal at an annual interest rate of 8% compounded continuously?

$$8-9 \text{ years}$$