

Practice 8-1

Exploring Exponential Models

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

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

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

5. $y = (0.3)^x$ 6. $y = 3^x$ 7. $y = 2\left(\frac{1}{5}\right)^x$ 8. $y = \frac{1}{2}(3)^x$

9. A new car that sells for \$18,000 depreciates 25% each year. Write a function that models the value of the car. Find the value of the car after 4 yr.
10. 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.
11. 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?
12. An investment of \$75,000 increases at a rate of 12.5% per year. Find the value of the investment after 30 yr.
13. 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?

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

14. (0, 2), (1, 1.3) 15. (-1, 12.5), (4, 4.096) 16. (1, 0.84), (2, 1.008)

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

17. +45% 18. -10% 19. -40% 20. +200%

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

21. $y = 1700(0.75)^x$ 22. $y = 30.698\left(\frac{5}{8}\right)^x$ 23. $y = 984.5(1.73)^x$

24. 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?