

7-6

Practice

Form K

Exponential Functions

Determine whether each table represents a linear or an exponential function. Explain. Remember that an exponential function exists when you have a constant ratio between the y values and a constant difference between the x values.

1.

x	1	2	3	4	5	6
y	2	4	8	16	32	64

exponential; y -values have a common ratio of 2

2.

x	1	2	3	4	5	6
y	1	4	7	10	13	16

linear; y -values have a common difference of 3

Determine whether each equation represents a linear or an exponential function. Remember, an exponential function takes the form $y = a \cdot b^x$ where $a \neq 0$ and $b > 0, b \neq 1$.

3. $y = 3 \cdot 2^x$ exponential function

4. $y = 4 \cdot \left(\frac{1}{5}\right)^x$ exponential function

5. $y = 5x - 8$ linear function

6. $y = 5 \cdot 1.07^x$ exponential function

Evaluate each function for the given value.

7. $y = 4^x$ for $x = 3$ 64

8. $f(x) = 2 \cdot 3^x$ for $x = 5$ 486

9. $h(t) = 60 \cdot 1.07^t$ for $t = 8$ 103.09

10. $y = 5 \cdot 7^x$ for $x = 0$ 5

11. What is the solution or solutions of $2^x = 7$? $x \approx 2.81$

7-6

Practice (continued)

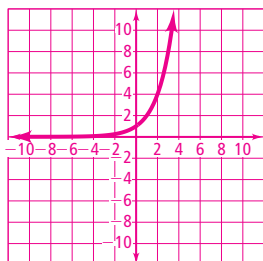
Form K

Exponential Functions

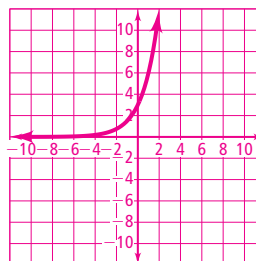
12. An investment of \$2000 in a bank account doubles every 5 years. The function that models the growth of this investment is $f(x) = 2000 \cdot 2^x$, where x is the number of doubling periods. How much will the investment be worth after two doubling periods, or 10 years? **\$8,000**
13. The city library will be increasing the number of books it has to loan at a rate of 5% per year. The library currently has 40,000 books. The number of books they will have in any given year is modeled by the function $h(t) = 40,000 \cdot 1.05^t$, where t is the number of years. How many books will the library have 8 years from now? **59,098.22**

Graph each exponential function.

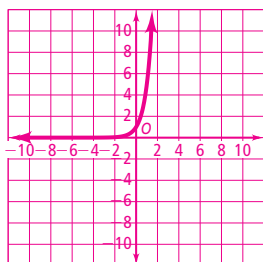
14. $y = 2^x$



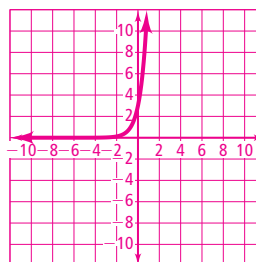
15. $y = 3 \cdot 2^x$



16. $y = 5^x$



17. $y = 3 \cdot 5^x$



18. **Writing** Discuss the similarities and differences between the four graphs that you sketched in Exercises 13–16. **Answers will vary.**

Solve each equation.

19. $2^x = 16$ **4**

20. $10 \cdot 3^x = 90$ **2**

21. $5^x - 4 = 21$ **2**

22. $4^x + 6 = 70$ **3**