

LESSON 5.6 Skills Practice

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Checkmate!
Solving Exponential Functions

Problem Set

Complete each table. Write a function that represents the data in the table and explain how you determined your expression.

1.

x	$f(x)$	Expression
0	1	3^0
1	3	3^1
2	9	3^2
3	27	3^3
4	81	3^4
5	243	3^5
x	3^x	-----

2.

x	$f(x)$	Expression
0	5	$4^0 + 5$
1	9	
2	21	
3	69	
4	261	
5	1029	
x		-----

The exponents of the expressions in the third column equal x . So, $f(x) = 3x$.



3.

x	$f(x)$	Expression
0	-1	-2^0
1	-2	
2	-4	
3		
4		
5		
x		-----

4.

x	$f(x)$	Expression
-2	$-\frac{1}{2}$	-2^{-1}
-1	-1	
0	-2	
1		
2		
3		
x		-----

5.

x	$f(x)$	Expression
0	$-\frac{1}{25}$	-5^{-2}
1	$-\frac{1}{5}$	
2	-1	
3		
4		
5		
x		-----

6.

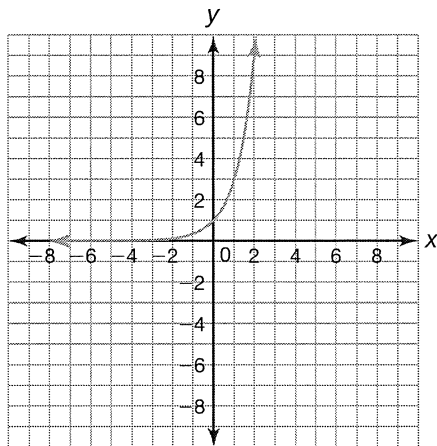
x	$f(x)$	Expression
0	16	2^4
1	8	
2	4	
3		
4		
5		
x		-----

5

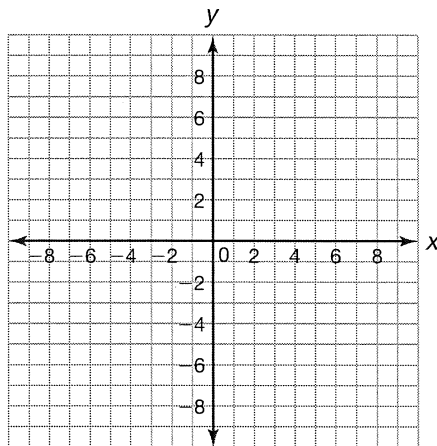
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Graph each function.

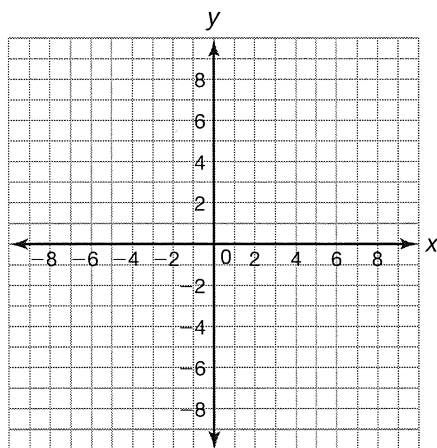
7. $f(x) = 3^x$



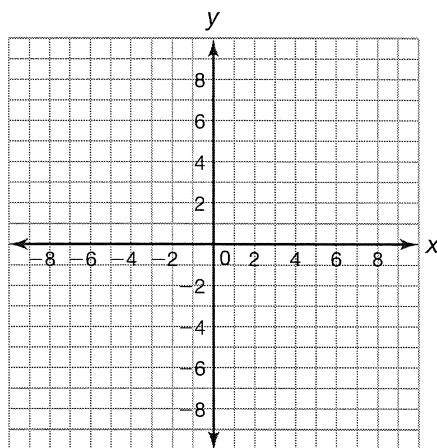
8. $f(x) = 8^{-x}$



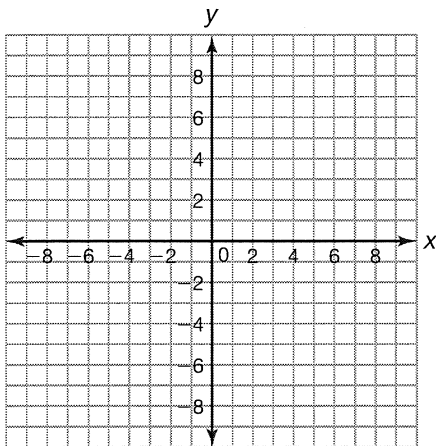
9. $f(x) = 5 \cdot 2^{-x}$



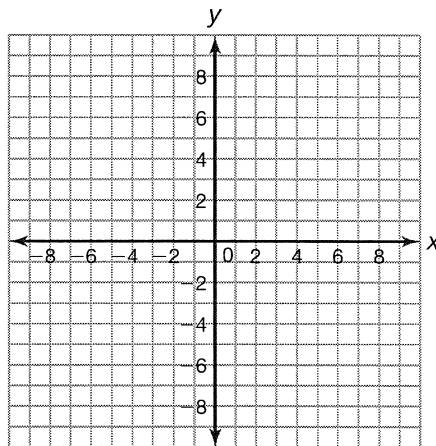
10. $f(x) = 2 \cdot 3^x$



11. $f(x) = -4^x$



12. $f(x) = -3^{x+2}$



Use the intersection feature of your graphing calculator to answer each question.

13. For the function $f(x) = 6^{x-1}$ determine the value of x for which $f(x) = 7776$.

For the function $f(x) = 6^{x-1}$, $f(x) = 7776$ when $x = 6$.

14. For the function $f(x) = -4^{x+2}$ determine the value of x for which $f(x) = -4096$.

15. For the function $f(x) = 5^{-x+1}$ determine the value of x for which $f(x) = 625$.

16. For the function $f(x) = 2^{x+4}$ determine the values of x for which $f(x) < 128$.

17. For the function $f(x) = -3^{x+1}$ determine the values of x for which $f(x) > -9$.

18. For the function $f(x) = 5^{x+2}$ determine the values of x for which $f(x) = 15,625$.

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Solve each exponential equation for x .

19. $4^x = 256$

$4^x = 256$

$4^4 = 256$

$x = 4$

20. $6^{3x} = 216$

21. $2^{5-x} = \frac{1}{16}$

22. $3^{-2x} = \frac{1}{729}$

23. $4^{x+3} = 4$

24. $\frac{1}{5^{x+4}} = 625$

25. $-6^{x-2} = \frac{1}{-1296}$

26. $\frac{1}{2^{x-6}} = \frac{1}{4}$

For each pair of expressions, determine whether the second expression is an equivalent form of the first expression.

27. 2^{s-1} $\frac{1}{2}(2)^2$
 $2^{-1} \cdot 2^s$
 2^{s-1}

28. 3^{x+1} $\frac{1}{3}(3)^x$

29. 2^{2x+1} $2(4)^x$

30. 5^{2x-1} $\frac{1}{5}(10)^x$

31. $4(64)^x$ 4^{3x+1}

32. $\frac{1}{2}\left(\frac{1}{8}\right)^x$ 2^{-3x-1}

Write the exponential function represented by the table of values.

33.

x	y
0	2
1	1
2	$\frac{1}{2}$
3	$\frac{1}{4}$

$$f(x) = a \cdot b^x$$

$$f(x) = 2 \cdot b^x$$

$$1 = 2 \cdot b^1$$

$$\frac{1}{2} = b$$

$$f(x) = 2 \left(\frac{1}{2}\right)^x$$

34.

x	y
0	1
2	25
4	625
6	15625



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35.

x	y
0	1
1	$\frac{3}{4}$
2	$\frac{9}{16}$
3	$\frac{27}{64}$

36.

x	y
0	-1
2	-4
4	-16
6	-64

37.

x	y
0	3
3	$\frac{1}{9}$
6	$\frac{1}{243}$
9	$\frac{1}{6561}$

38.

x	y
0	-2
1	$-\frac{1}{2}$
2	$-\frac{1}{8}$
3	$-\frac{1}{32}$