3.1 Practice WITH CalcChat® AND CalcView®

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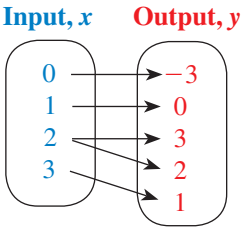
In Exercises 1–6, determine whether the relation is a function. Explain. *Example 1*

1. (1, −2), (2, 1), (3, 6), (4, 13), (5, 22)

2. (7, 4), (5, −1), (3, −8), (1, −5), (3, 6)

3.



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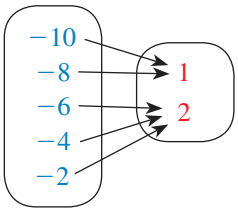


5.

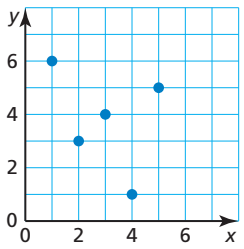
Input, x	16	1	0	1	16
Output, y	−2	−1	0	1	2

6.

Input, x	−3	0	3	6	9
Output, y	$\frac{2}{3}$	$\frac{1}{3}$	0	$-\frac{1}{3}$	$-\frac{2}{3}$

In Exercises 7–10, determine whether the graph represents a function. Explain. *Example 2*

7.



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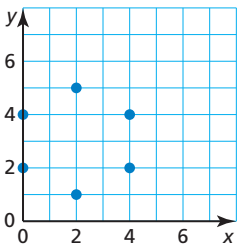

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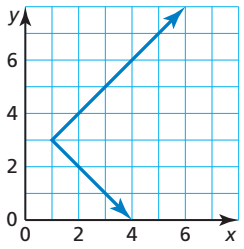

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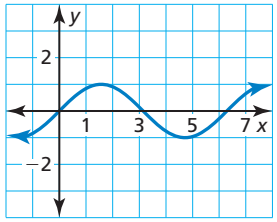
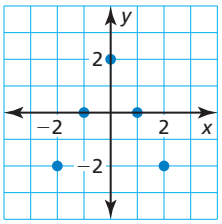


In Exercises 11–14, find the domain and range of the function represented by the graph. *Example 3*

11.



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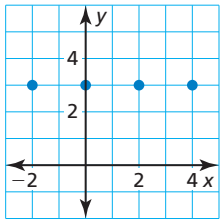

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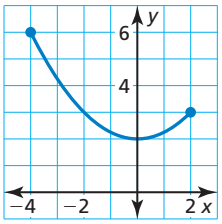
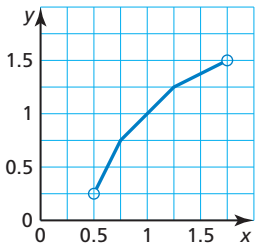


14.



ANALYZING RELATIONSHIPS In Exercises 15 and 16, identify the independent and dependent variables.

15. the number of quarters you put into a parking meter and the amount of time on the meter

16. the amount of gasoline in a car's fuel tank and the amount of time spent driving

17. MODELING REAL LIFE A cell phone plan costs $30 for each line. *Example 4*

a. Does the situation represent a function? If so, identify the independent and dependent variables.

b. You can have a maximum of four lines on a plan. Find the domain and range.

18. MODELING REAL LIFE A taxi company charges an initial fee of $2.80 plus $3.50 per mile traveled.

a. Does the situation represent a function? If so, identify the independent and dependent variables.

b. You have enough money to travel at most 20 miles in the taxi. Find the domain and range.

ERROR ANALYSIS **In Exercises 19 and 20, describe and correct the error in the statement about the relation shown in the table.**

Input, x	1	2	3	4	5
Output, y	$6\frac{1}{2}$	$7\frac{1}{2}$	$8\frac{1}{2}$	$6\frac{1}{2}$	$9\frac{1}{2}$

19.

The relation is *not* a function. One output is paired with two inputs.

20.

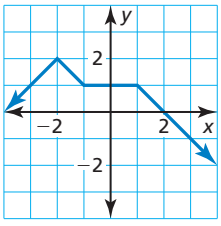
The relation is a function. The range is 1, 2, 3, 4, and 5.

21. **MULTIPLE REPRESENTATIONS** The table shows the balance of a savings account over time. Represent the situation in words and in a coordinate plane. Does the situation represent a function? Explain.

Month, x	0	1	2	3	4
Balance (dollars), y	100	125	150	175	200

22. **MULTIPLE REPRESENTATIONS** The equation $1.5x + 0.5y = 12$ represents the number x of hardcover books and the number y of softcover books you can buy at a used book sale. Represent the situation in a table and in a coordinate plane. Does the situation represent a function? Explain.

23. MP **PRECISION** The graph represents a function. Find the input value corresponding to an output of 2.

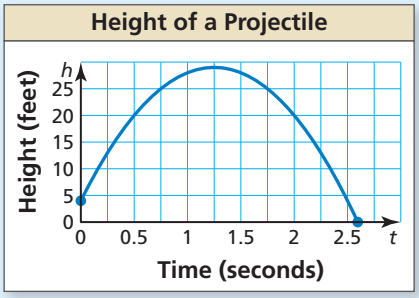


24. **OPEN-ENDED** Complete the table so that when t is the independent variable, the relation is a function, and when t is the dependent variable, the relation is not a function.

t				
v				

25. **MAKING AN ARGUMENT** Your friend says that a line always represents a function. Is your friend correct? Explain.

26. **HOW DO YOU SEE IT?**
The graph represents the height h of a projectile after t seconds.



a. Is h is a function of t? Explain.

b. Approximate the height of the projectile after 0.5 second and after 1.25 seconds.

c. Approximate the domain and range.

d. Is t a function of h? Explain.

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MP **PRECISION** **In Exercises 27–30, determine whether the statement uses the word *function* in a way that is mathematically correct. Explain your reasoning.**

27. The selling price of an item is a function of the cost of making the item.

28. The sales tax on a purchased item in a given state is a function of the selling price.

29. A function pairs each student in your school with a homeroom teacher.

30. A function pairs each chaperone on a school trip with 10 students.

MP **REASONING** **In Exercises 31–34, tell whether the statement is *true* or *false*. If it is false, explain why.**

31. Every function is a relation.

32. Every relation is a function.

33. When you switch the inputs and outputs of any function, the resulting relation is a function.

34. When the domain of a function has an infinite number of values, the range always has an infinite number of values.

35. **COLLEGE PREP** Which of the following values of x and y make the relation a function? Select all that apply.

$(-3, 7), (-2, 3), (0, 8), (1, -1), (x, y)$

Ⓐ $x = -4, y = 0$ Ⓑ $x = 1, y = -2$

Ⓒ $x = 5, y = -1$ Ⓓ $x = 2, y = 8$