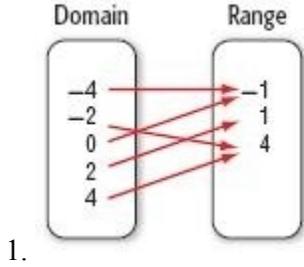


1-7 Functions

Determine whether each relation is a function.
Explain.



ANSWER:

Yes; for each input there is exactly one output.

Domain	Range
2	6
5	7
6	9
6	10

2.

ANSWER:

No; the domain value 6 is paired with both 9 and 10.

3. $\{(2, 2), (-1, 5), (5, 2), (2, -4)\}$

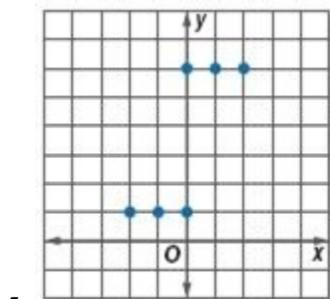
ANSWER:

No; the domain value 2 is paired with 2 and -4 .

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

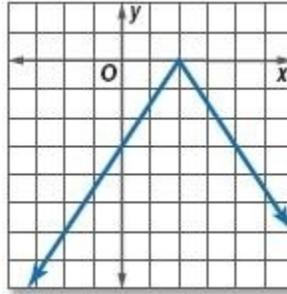
ANSWER:

Yes; the graph passes the vertical line test.



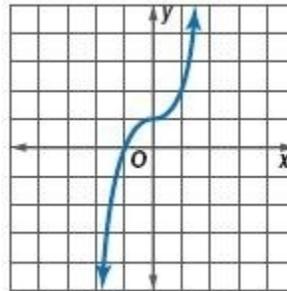
ANSWER:

No; when $x = 0$, $y = 1$ and $y = 6$.



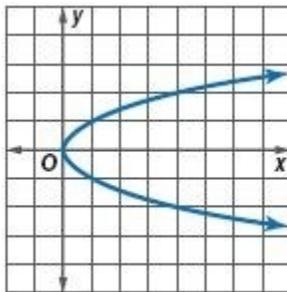
ANSWER:

Yes; the graph passes the vertical line test.



ANSWER:

Yes; the graph passes the vertical line test.



ANSWER:

No; the graph does not pass the vertical line test.

1-7 Functions

9. **SCHOOL ENROLLMENT** The table shows the total enrollment in U.S. public schools.

School Year	2004–05	2005–06	2006–07	2007–08
Enrollment (in thousands)	48,560	48,710	48,948	49,091

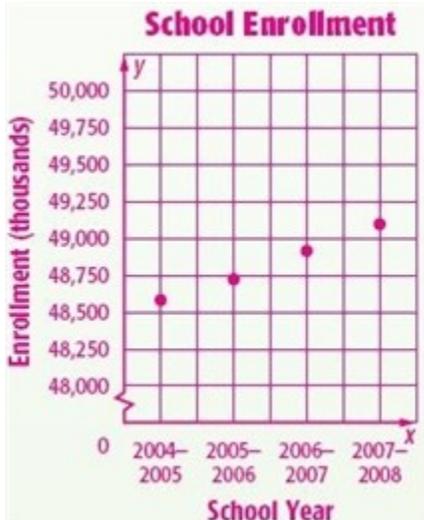
Source: *The World Almanac*

- a. Write a set of ordered pairs representing the data in the table if x is the number of school years since 2004–2005.
- b. Draw a graph showing the relationship between the year and enrollment.
- c. Describe the domain and range of the data.

ANSWER:

- a. $\{(0, 48,560), (1, 48,710), (2, 48,948), (3, 49,091)\}$

b.



- c. The domain is the school year and the range is the enrollment.

10. **CCSS REASONING** The cost of sending cell phone pictures is given by $y = 0.25x$, where x is the number of pictures sent, and y is the cost in dollars.

- a. Write the equation in function notation. Interpret the function in terms of the context.
- b. Find $f(5)$ and $f(12)$. What do these values represent?
- c. Determine the domain and range of this function.

ANSWER:

a. $f(x) = 0.25x$

- b. $f(5) = \$1.25, f(12) = \3.00 ; These values represent the cost to send five and twelve pictures, respectively.

- c. The domain is the number of pictures sent and the cost is the range.

If $f(x) = 6x + 7$ and $g(x) = x^2 - 4$, find each value.

11. $f(-3)$

ANSWER:

-11

12. $f(m)$

ANSWER:

$6m + 7$

13. $f(r - 2)$

ANSWER:

$6r - 5$

14. $g(5)$

ANSWER:

21

15. $g(a) + 9$

ANSWER:

$a^2 + 5$

1-7 Functions

16. $g(-4t)$

ANSWER:

$$16t^2 - 4$$

17. $f(q + 1)$

ANSWER:

$$6q + 13$$

18. $f(2) + g(2)$

ANSWER:

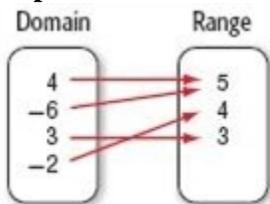
$$19$$

19. $g(-b)$

ANSWER:

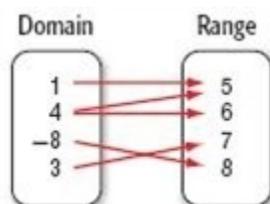
$$b^2 - 4$$

Determine whether each relation is a function. Explain.



ANSWER:

yes; for each input there is exactly one output.



ANSWER:

no; the domain value 4 is paired with both 5 and 6.

22.

Domain	Range
4	6
-5	3
6	-3
-5	5

ANSWER:

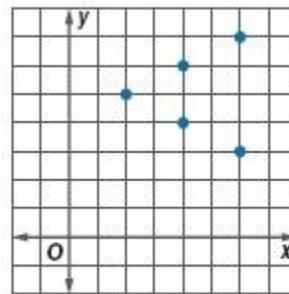
no; the domain value -5 is paired with both 3 and 5.

23.

Domain	Range
-4	2
3	-5
4	2
9	-7
-3	-5

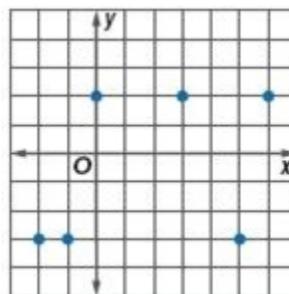
ANSWER:

yes; for each input there is exactly one output.



ANSWER:

no; when $x = 4$, $y = 4$ and $y = 6$.



ANSWER:

yes; the graph passes the vertical line test.

1-7 Functions

26. **CCSS SENSE-MAKING** The table shows the median home prices in the United States, from 2007 to 2009.

Year	Median Home Price (\$)
2007	234,300
2008	213,200
2009	212,200

- a. Write a set of ordered pairs representing the data in the table.
- b. Draw a graph showing the relationship between the year and price.
- c. What is the domain and range for this data?

ANSWER:

- a. $\{(2007, 234,300), (2008, 213,200), (2009, 212,200)\}$

b.



- c. The domain is the year. The range is the median home price.

Determine whether each relation is a function.

27. $\{(5, -7), (6, -7), (-8, -1), (0, -1)\}$

ANSWER:

yes

28. $\{(4, 5), (3, -2), (-2, 5), (4, 7)\}$

ANSWER:

no

29. $y = -8$

ANSWER:

yes

30. $x = 15$

ANSWER:

no

31. $y = 3x - 2$

ANSWER:

yes

32. $y = 3x + 2y$

ANSWER:

yes

If $f(x) = -2x - 3$ and $g(x) = x^2 + 5x$, find each value.

33. $f(-1)$

ANSWER:

-1

34. $f(6)$

ANSWER:

-15

35. $g(2)$

ANSWER:

14

36. $g(-3)$

ANSWER:

-6

37. $g(-2) + 2$

ANSWER:

-4

38. $f(0) - 7$

ANSWER:

-10

1-7 Functions

39. $f(4y)$

ANSWER:

$$-8y - 3$$

40. $g(-6m)$

ANSWER:

$$36m^2 - 30m$$

41. $f(c - 5)$

ANSWER:

$$-2c + 7$$

42. $f(r + 2)$

ANSWER:

$$-2r - 7$$

43. $5[f(d)]$

ANSWER:

$$-10d - 15$$

44. $3[g(n)]$

ANSWER:

$$3n^2 + 15n$$

45. **EDUCATION** The average national math test scores $f(t)$ for 17-year-olds can be represented as a function of the national science scores t by $f(t) = 0.8t + 72$.

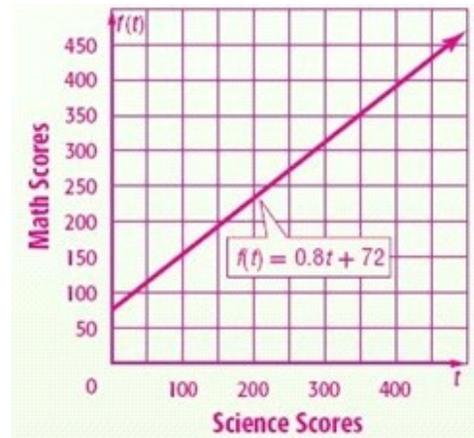
a. Graph this function. Interpret the function in terms of the context.

b. What is the science score that corresponds to a math score of 308?

c. What is the domain and range of this function?

ANSWER:

a.



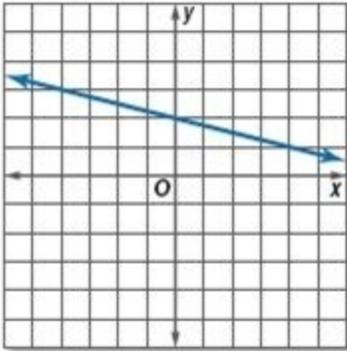
When the science score is 0, the math score is 72. For each point the science score increases, the math score increases by 0.8 point.

b. 295

c. The domain is the set of science scores. The range is the set of math scores.

1-7 Functions

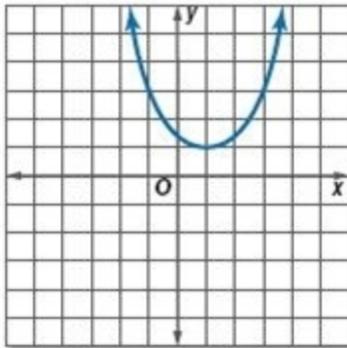
Determine whether each relation is a function.



46.

ANSWER:

yes



47.

ANSWER:

yes

48. **BABYSITTING** Christina earns \$7.50 an hour babysitting.

- Write an algebraic expression to represent the money Christina will earn if she works h hours.
- Choose five values for the number of hours Christina can babysit. Create a table with h and the value for the amount of money she will make during that time.
- Use the values in your table to create a graph.
- Does it make sense to connect the points in your graph with a line? Why or why not?

ANSWER:

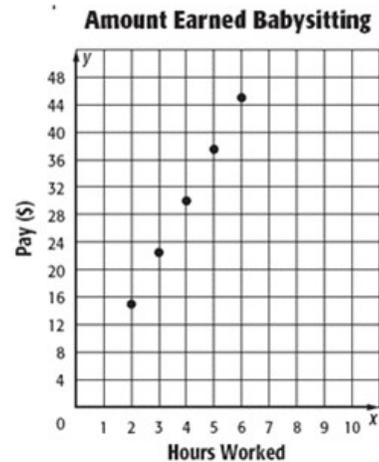
a. $\$7.50h$

b. Sample answer:

Sample Answer:

h	$\$7.50h$
3	\$22.50
5	\$37.50
2	\$15
4	\$30
6	\$45

c.



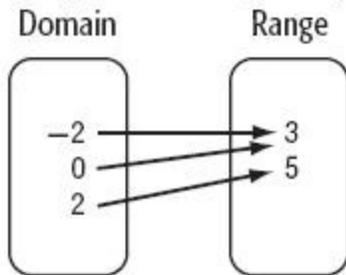
d. Yes, because they could pay Christina for partial hours that she worked.

1-7 Functions

49. **OPEN ENDED** Write a set of three ordered pairs that represent a function. Choose another display that represents this function.

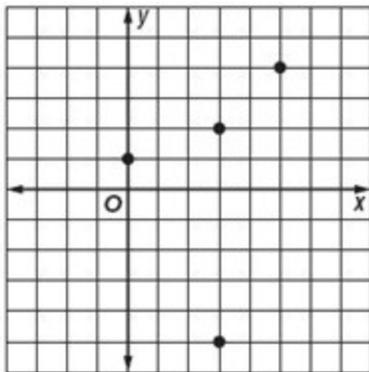
ANSWER:

Sample answer: $\{(-2, 3), (0, 3), (2, 5)\}$;



50. **REASONING** The set of ordered pairs $\{(0, 1), (3, 2), (3, -5), (5, 4)\}$ represents a relation between x and y . Graph the set of ordered pairs. Determine whether the relation is a function. Explain.

ANSWER:



Not a function; one member of the domain, 3, is paired with two different members of the range, -5 and 2 .

51. **CHALLENGE** Consider $f(x) = -4.3x - 2$. Write $f(g + 3.5)$ and simplify by combining like terms.

ANSWER:

$$f(g + 3.5) = -4.3g - 17.05$$

52. **WRITE A QUESTION** A classmate graphed a set of ordered pairs and used the vertical line test to determine whether it was a function. Write a question to help her decide if the same strategy can be applied to a mapping.

ANSWER:

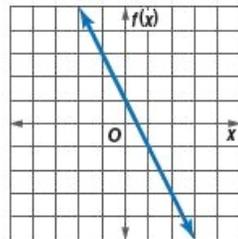
Sample answer: Isn't a mapping another representation of a set of ordered pairs?

53. **CCSS PERSEVERENCE** If $f(3b - 1) = 9b - 1$, find one possible expression for $f(x)$.

ANSWER:

Sample answer: $f(x) = 3x + 2$

54. **ERROR ANALYSIS** Corazon thinks $f(x)$ and $g(x)$ are representations of the same function. Maggie disagrees. Who is correct? Explain your reasoning.



x	$g(x)$
-1	1
0	-1
1	-3
2	-5
3	-7

ANSWER:

Maggie; the graph represents $f(x) = -2x + 1$ and the table represents $g(x) = -2x - 1$.

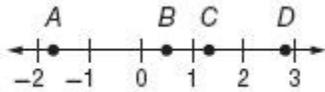
55. **WRITING IN MATH** How can you determine whether a relation represents a function?

ANSWER:

Sample answer: You can determine whether each element of the domain is paired with exactly one element of the range. For example, if given a graph, you could use the vertical line test; if a vertical line intersects the graph more than once, then the relation that the graph represents is not a function.

1-7 Functions

56. Which point on the number line represents a number whose square is less than itself?



A A

B B

C C

D D

ANSWER:

B

57. Determine which of the following relations is a function.

F $\{(-3, 2), (4, 1), (-3, 5)\}$

G $\{(2, -1), (4, -1), (2, 6)\}$

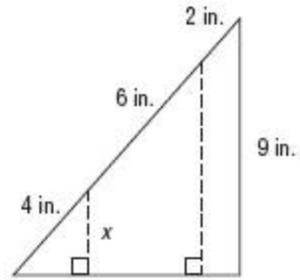
H $\{(-3, -4), (-3, 6), (8, -2)\}$

J $\{(5, -1), (3, -2), (-2, -2)\}$

ANSWER:

J

58. **GEOMETRY** What is the value of x ?



A 3 in

B 4 in.

C 5 in.

D 6 in.

ANSWER:

A

59. **SHORT RESPONSE** Camille made 16 out of 19 of her serves during her first volleyball game. She made 13 out of 16 of her serves during her second game. During which game did she make a greater percent of her serves?

ANSWER:

her first game

Solve each equation.

60. $x = \frac{27+3}{10}$

ANSWER:

3

61. $m = \frac{3^2+4}{7-5}$

ANSWER:

$\frac{13}{2}$

62. $z = 32 + 4(-3)$

ANSWER:

20

1-7 Functions

63. **SCHOOL SUPPLIES** The table shows the prices of some items Tom needs. If he needs 4 glue sticks, 10 pencils, and 4 notebooks, write and evaluate an expression to determine Tom's cost.

School Supplies Prices	
glue stick	\$1.99
pencil	\$0.25
notebook	\$1.85

ANSWER:

$4(\$1.99) + 10(0.25) + (1.85) = 17.86$, so the cost is \$17.86.

Write a verbal expression for each algebraic expression.

64. $4y + 2$

ANSWER:

Sample answer: four times y plus two

65. $\frac{2}{3}x$

ANSWER:

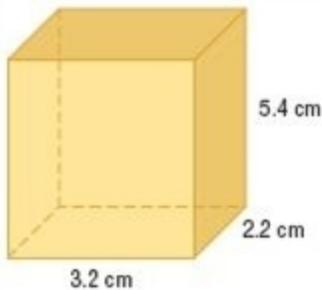
Sample answer: two thirds times x

66. $a^2b + 5$

ANSWER:

Sample answer: a squared times b plus 5

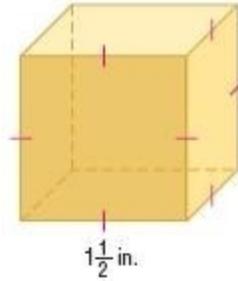
Find the volume of each rectangular prism.



67. 3.2 cm

ANSWER:

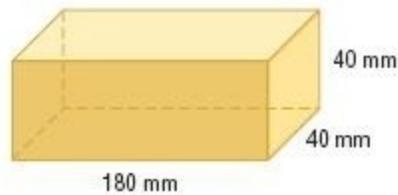
38.016 cm^3



68.

ANSWER:

$3\frac{3}{8} \text{ in.}^3$



69.

ANSWER:

$288,000 \text{ mm}^3$

Evaluate each expression.

70. If $x = 3$, then $6x - 5 = \underline{\quad} .$

ANSWER:

13

71. If $n = -1$, then $2n + 1 = \underline{\quad} .$

ANSWER:

-1

72. If $p = 4$, then $3p + 4 = \underline{\quad} .$

ANSWER:

16

73. If $q = 7$, then $7q - 9 = \underline{\quad} .$

ANSWER:

40

74. If $y = 10$, then $8y - 15 = \underline{\quad} .$

ANSWER:

65

1-7 Functions

75. If $k = -11$, then $4k + 6 = \underline{\quad} ?$

ANSWER:

-38