

3 EXAMPLE Making a Table From a Function Rule

Make a table for $f(n) = -2n^2 + 7$. Use 1, 2, 3, and 4 as domain values.

n	$-2n^2 + 7$	$f(n)$
1	$-2(1)^2 + 7$	5
2	$-2(2)^2 + 7$	-1
3	$-2(3)^2 + 7$	-11
4	$-2(4)^2 + 7$	-25

Vocabulary Tip

You can think of the notation $f(6)$ as "Replace n with 6 to find the value of $f(6)$."



3 Make a table for $y = 8 - 3x$. Use 1, 2, 3, and 4 as domain values.

You can use a function rule and a given domain to find the range of the function. After computing the range values, write the values in order from least to greatest.

4 EXAMPLE Finding the Range

Evaluate the function rule $f(a) = -3a + 5$ to find the range of the function for the domain $\{-3, 1, 4\}$.

$f(a) = -3a + 5$	$f(a) = -3a + 5$	$f(a) = -3a + 5$
$f(-3) = -3(-3) + 5$	$f(1) = -3(1) + 5$	$f(4) = -3(4) + 5$
$f(-3) = 14$	$f(1) = 2$	$f(4) = -7$

The range is $\{-7, 2, 14\}$.



4 Find the range of each function for the domain $\{-2, 0, 5\}$.

a. $f(x) = x - 6$ b. $y = -4x$ c. $g(t) = t^2 + 1$

EXERCISES

For more exercises, see *Extra Skill and Word Problem Practice*.

Practice and Problem Solving

A Practice by Example

Example 1
(page 257)

Use a mapping diagram to determine whether each relation is a function.

1. $\{(3, 7), (3, 8), (3, -2), (3, 4), (3, 1)\}$
2. $\{(6, -7), (5, -8), (1, 4), (5, 5)\}$
3. $\{(0.04, 0.2), (0.2, 1), (1, 5), (5, 25)\}$
4. $\{(4, 2), (1, 1), (0, 0), (1, -1), (4, -2)\}$



Example 2
(page 258)

Use the vertical-line test to determine whether each relation is a function.

5. $\{(2, 5), (3, -5), (4, 5), (5, -5)\}$
6. $\{(5, 0), (0, 5), (5, 1), (1, 5)\}$
7. $\{(3, -1), (-2, 3), (-1, -5), (3, 2)\}$
8. $\{(-2, 9), (3, 9), (-0.5, 9), (4, 9)\}$

Example 3
(page 259)

Make a table for each function. Use 1, 2, 3, and 4 for the domain.

- | | | | |
|---------------------|-------------------|------------------------|---------------------|
| 9. $f(x) = x + 7$ | 10. $y = 11x - 1$ | 11. $f(x) = x^2$ | 12. $f(x) = -4x$ |
| 13. $f(x) = 15 - x$ | 14. $y = 3x + 2$ | 15. $y = \frac{1}{4}x$ | 16. $f(x) = -x + 2$ |

Example 4
(page 259)

Find the range of the function rule $y = 5x - 2$ for each domain.

17. $\{0.5, 11\}$
18. $\{-1.2, 0, 4\}$
19. $\{-5, -1, 0, 2, 10\}$
20. $\left\{-\frac{1}{2}, \frac{1}{4}, \frac{2}{5}\right\}$

B Apply Your Skills

Determine whether each relation is a function. If the relation is a function, state the domain and range.

21.

x	y
1	-3
6	-2
9	-1
1	3

22.

x	y
0	2
3	1
3	-1
5	3

23.

x	y
-4	-4
-1	-4
0	-4
3	-4

24. **Error Analysis** A student thinks that the relation $\{(2, 1), (3, -2), (4, 5), (5, -2)\}$ is not a function because two values in the domain have the same range value. What is the student's error?

25. **Iguanas** Use the data in the table at the left. Is an iguana's length a function of its age? Explain.

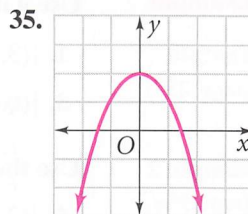
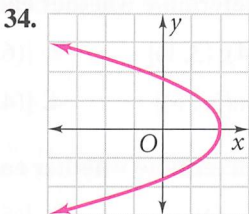
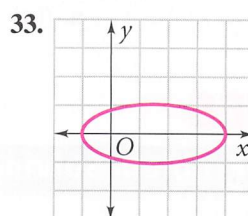
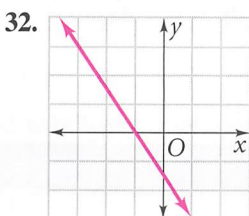
26. **Open-Ended** Create a data table for a relation that is *not* a function. Describe what your data might represent.

Find the range of each function for the domain $\{-1, 0.5, 3, 7\}$.

27. $f(x) = 4x + 1$ 28. $g(x) = -4x + 1$ 29. $y = |x| - 1$ 30. $s(t) = t^2 - 1$

31. **a. Profit** A store bought a case of disposable cameras for \$300. The store's profit p on the cameras is a function of the number c of cameras sold. Find the range of the function $p = 6c - 300$ when the domain is $\{0, 15, 50, 62\}$.
b. Critical Thinking In this situation, what do the domain and range represent?

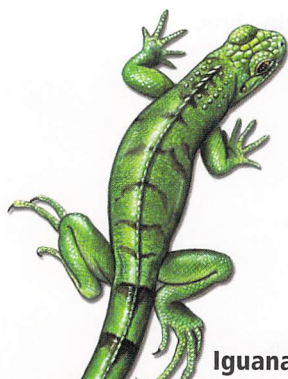
Determine whether each graph is the graph of a function.



36. **Physics** Light travels about 186,000 miles per second. The rule $d = 186,000t$ describes the relationship between distance d in miles and time t in seconds.
a. How far does light travel in 20 seconds?
b. How far does light travel in 1 minute?

For Exercises 37–40 assume that each variable has a different value. Determine whether each relation is a function.

37. $\{(a, b), (b, a), (c, c), (e, d)\}$ 38. $\{(b, b), (c, d), (d, c), (c, a)\}$
 39. $\{(c, e), (c, d), (c, b)\}$ 40. $\{(a, b), (b, c), (c, d), (d, e)\}$



Iguanas

Age (years)	Length (inches)
2	30
4	37
3	31
5	45
4	40