Algebra

# 7-4 Graphing Functions

CONTENT STANDARDS
6.EE.9

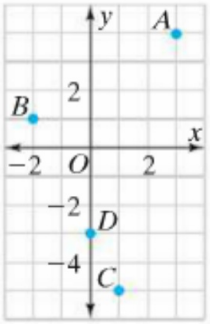
## What You'll Learn

To graph functions using data in a table.

**New Vocabulary** linear function

## Check Skills You'll Need

Give the coordinates for each point.



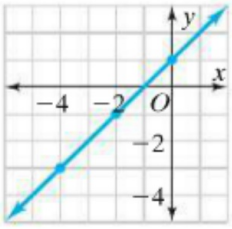

2. *A* [ ] 3. *B* [ ]
4. *C* [ ] 5. *D* [ ]

## Why Learn This?

You can use the data in a table to graph a function. The graph and the table both model the same function, but in different ways.

| x | y |
|---|---|
| 0 | 1 |
| −2 | −1 |
| −4 | −3 |

A function is a **linear function** if its graph is a line. For data in a table, graph the data as points. If you can join the points with a line, then the relationship of the data is a linear function. The data points for a nonlinear function do not fall on a line.

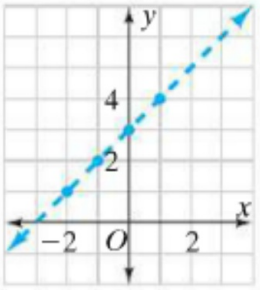


## EXAMPLE Graphing a Function from a Table

**1** Graph the data in the table. Determine whether the relationship is a linear function.

| x | y |
|---|---|
| −2 | 1 |
| −1 | 2 |
| 0 | 3 |
| 1 | 4 |

Plot the points $(-2,1)$, $(-1,2)$, $(0,3)$, and $(1,4)$.




Connect the points. These four points lie on the same line.

The function is linear.

**1 EXAMPLE** Complete the function table given the rule:
Output = Input ÷ (–3).

| Input | Output |
|---|---|
| –9 | 3 |
| –3 | 1 |
| 12 | –4 |
| 15 | –5 |

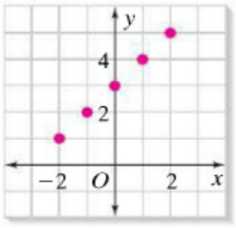
← Divide –9 by –3. Place 3 in the Output column.
← Divide –3 by –3. Place 1 in the Output column.
← Divide 12 by –3. Place –4 in the Output column.
← Divide 15 by –3. Place –5 in the Output column.

## EXAMPLE Graphing a Function

**2** Make a table and graph some points of the function $y = x + 3$.

| $x$ | $y$ |
|---|---|
| −2 | 1 |
| −1 | 2 |
| 0 | 3 |
| 1 | 4 |
| 2 | 5 |

← $-2 + 3 = 1$
← $-1 + 3 = 2$
← $0 + 3 = 3$
← $1 + 3 = 4$
← $2 + 3 = 5$



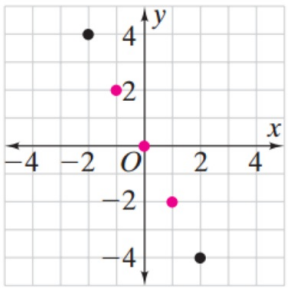

**Test Prep Tip**

When making a table of values for a function rule, choose lesser values for the independent variable so that you are less likely to make a computation error.

**2 Graphing a Function** Make a table and graph some points of the function $y = -2x$.

| Input ($x$) | Output ($y$) |
|---|---|
| −2 | 4 |
| −1 | |
| 0 | |
| 1 | |
| 2 | −4 |

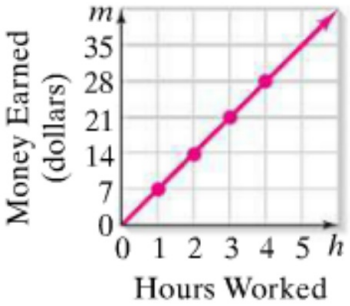
← $-2(-2) = 4$
← $-2(-1) =$
← $-2($ $) =$
← $-2($ $) =$
← $-2(2) = -4$



## EXAMPLE 3 Application: Salaries

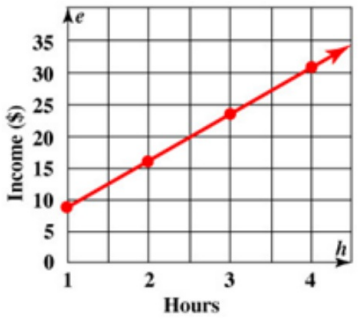
A babysitter makes \$7 an hour. The function $m = 7h$ shows how the money $m$ he earns relates to the number of hours $h$ he works. Make a table and graph the function.

| Hours Worked | Money Earned (dollars) |
|---|---|
| 1 | 7 |
| 2 | 14 |
| 3 | 21 |
| 4 | 28 |




**EXAMPLE 3** Henry receives \$8.00 per hour for babysitting two children. The function $e = 8h$ shows how the earnings $e$ relate to the number of hours $h$ that Henry babysits. Make a table and graph the function.

| Hours | Earnings (\$) |
|---|---|
| 1 | 8 |
| 2 | 16 |
| 3 | 24 |
| 4 | 32 |



## More Than One Way

A pizza delivery person receives $5 each day he reports to work and $2 for each pizza he delivers. You can express this situation as the function $y = 5 + 2x$, where $y$ = earnings and $x$ = number of pizzas he delivers. How much will the delivery person earn in one day if he delivers 25 pizzas?

### Jessica's Method

I can evaluate the equation to find the amount the delivery person earns. To do so, I replace $x$ with the 25 pizzas he delivers.

$y = 5 + 2x$ ← Write the equation.

$y = 5 + 2(25)$ ← Substitute 25 for $x$.

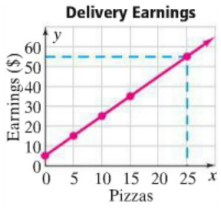
$y = 55$

The delivery person will earn $55 for delivering 25 pizzas.

### Leon's Method

If I make a table and a graph, I can tell how much the delivery person earns for delivering different numbers of pizzas.

| x | y |
|---|---|
| 0 | 5 |
| 5 | 15 |
| 10 | 25 |
| 15 | 35 |




All the points lie on a line, so I can use the graph to find the amount earned for 25 pizzas delivered. When $x = 25$, the $y$-value is 55. So the delivery person earned $55.

## Check Your Understanding

1. **Vocabulary** Describe the graph of a linear function.

2. **Reasoning** How are the graph and table for a function related?

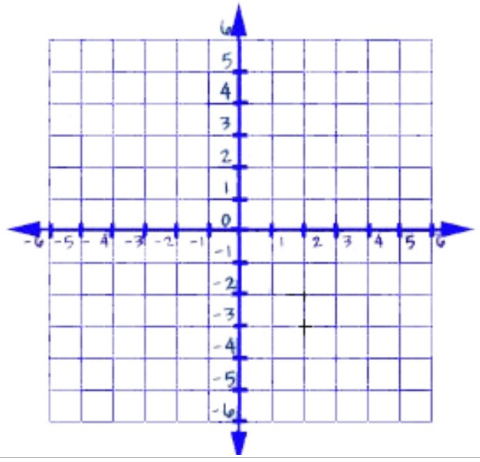
3. Complete the table for the function $y = x + 3$.

| x | y |
|---|---|
| −4 | |
| −3 | |
| −2 | |
| −1 | |

4. What are the ordered pairs for the table in Exercise 3?

5. Complete the table and then graph three points of the function $y = 3x$.

| x | y |
|---|---|
| −1 | |
| 0 | |
| 1 | |



Name _____ Class _____ Date _____

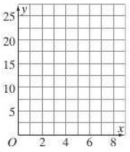
## Practice 7-4

**Graphing Functions**

**Graph the data in the table. Determine whether the relationship is a linear function.**

**1.**

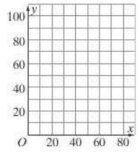
| Input | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Output | 5 | 10 | 15 | 20 | 25 |




Is it linear? _____

**2.**

| Input | 10 | 20 | 30 | 40 | 50 |
|---|---|---|---|---|---|
| Output | 20 | 40 | 60 | 70 | 100 |




Is it linear? _____

**Make a table and graph each function. Use $x$-values of $-2$, $-1$, 0, 1, and 2.**

**3.** $y = x - 1$




**4.** $y = 3x$




**5.** A parking garage charges \$3.50 per hour to park. The function rule: $c = 3.5\,h$ shows how the number of hours $h$ relates to the parking charge $c$. Graph the function.