Algebra

7-5 Functions in the Real World

CONTENT STANDARDS
6.EE.9

What You'll Learn

To use equations, tables, and graphs to represent real-world function situations

Why Learn This?

You can use functions to find how much you earn while working at a job.

Tables, graphs, and equations can represent functions. You can make a table, graph, or equation to represent a situation that can be modeled with a function, such as hours worked and money earned, and then use the representation to solve the problem.

EXAMPLE 1 Using a Table

Wages Paul works in a pet store during the summer. He earns $7.50 per hour. Make a table showing the relationship between hours worked and amount earned. How much does he earn in a week if he works 22 hours?

Step 1 Determine the independent and dependent variables. The amount he earns depends on the number of hours he works. So dollars is the dependent variable and hours is the independent variable.

Step 2 Make a table of the possible amounts that he earns. Choose some values for the number of hours worked, including 22 hours. Then, find the amount he earned for each value. To do this, multiply the number of hours by 7.50.

Number of Hours	Dollars Earned
10	75
14	105
22	165
30	225

Step 3 Answer the question.

When Paul works 22 hours, he earns $165.

Example

1 Using a Table Caroline makes $9 per hour while working at a department store. Make a table showing the relationship between hours worked and amount earned. How much will she make in a 37-hour week?

Step 1: Determine the independent and dependent variables.

The amount she earns depends on the number of hours she works, so _____ is the dependent variable and _____ is the independent variable.

Step 2: Then, make a table of possible amounts that she earns.

Choose some values for the number of hours worked, including 37. Then, find the amount she earned for each value. To do this, multiply the number of hours by _____.

Hours	$ Earned
8	72
23	
37	
40	

Step 3: Read the table. If Caroline works 37 hours, she earns _____.

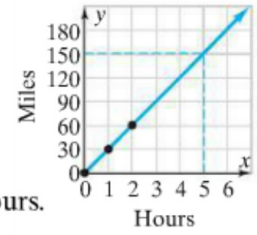
EXAMPLE Using a Graph

2 Traveling A car travels at 30 miles per hour. How far does the car travel in 5 hours?

Step 1 Determine the independent and dependent variables.
The distance the car travels depends on time of travel. So miles is the dependent variable and hours is the independent variable.

Step 2 Make a graph for the situation.

In 0 hours, the car goes 0 miles. (0, 0)
In 1 hour, the car goes 30 miles. (1, 30)
In 2 hours, the car goes 60 miles. (2, 60)



Step 3 Find the point on the line that represents distance when the time is 5 hours.

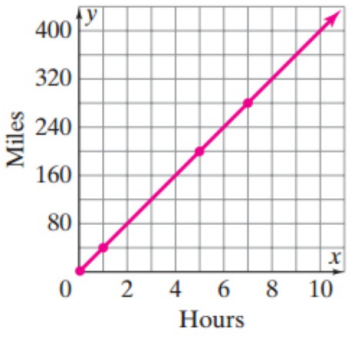
In 5 hours, the car travels 150 miles.

Test Prep Tip

When using a graph to find an answer, draw lines between the graph and the axes to make sure you are reading the point correctly.

Examples

2 **Using a Graph** A train travels at 40 miles per hour. Make a graph showing the relationship between time and distance. How far does it travel in 7 hours?



Step 1: Make a graph for the situation. Graph three points and connect them.

In 0 hours, the train goes 0 miles.
The point is (0, 0).

In 1 hour, the train goes 40 miles.
The point is _____.

In 5 hours, the train goes _____ miles.
The point is _____.

Step 2: Find the point that represents distance when the time is 7 hours. _____

In 7 hours, this train traveled _____

EXAMPLE Using an Equation

3 **Buying Tickets** Tickets to the concert cost $10.50 each. Write an equation showing the relationship between tickets purchased and cost. How much does it cost to buy 5 tickets?

Step 1 Determine the independent and dependent variables.
The cost depends on the tickets purchased. So cost is the dependent variable and number of tickets is the independent variable.

Step 2 Write an equation.
The independent variable (x) is the number of number of tickets purchased, and the dependent variable (y) is the cost.
$y = 5x$

Step 3 Substitute 10.50 for x, and simplify.
$y = 5(10.50) = 52.50$ ← **Substitute 10.50 for *x*.**

For 5 tickets, the cost is $52.50.

3 Using an Equation In a card game, you get 10 points for every hand that you win. Write an equation showing the relationship between the number of hands and the number of points. How many points do you get if you win 7 hands?

Step 1: Write an equation.

The independent variable (x) is _____,

and the dependent variable (y) is the number of points earned.

$y =$ _____

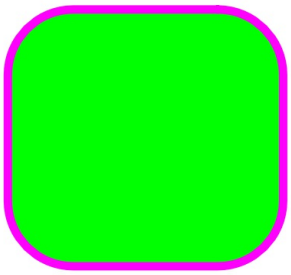
Step 2: Substitute 7 for x, and simplify.

$y = 10($_____$) =$ _____ ← **Substitute**

You would get _____ points.

Quick Check

1. Helen is a manager at a pet store. She earns $12 per hour. Make a table showing the relationship between hours worked and amount earned. How much does Helen earn if she works 40 hours?



Quick Check

2. Allen drives his car on vacation. He drives at 55 miles per hour. How far does Allen travel in 3 hours?

3. Josh buys tickets to a baseball game. Each ticket costs $8.75. Write an equation showing the relationship between tickets purchased and cost. How much will it cost Josh to buy 4 tickets?

Check Your Understanding

1. **Vocabulary** Name three ways that you can represent a function to solve a real-world problem.

or

Use the table for Exercises 2 and 3.

The library is having a used book sale.

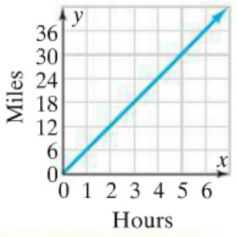
Number of Books Sold	Money Received ($)
12	48
19	76
31	124
54	216

2. How much money will the library fund receive if 19 books are sold?

3. How many books must be sold to receive $216?

Use the graph for Exercises 4 and 5.

Kelly tracks how far she has run during the week.



4. How far did she run in 4 hours?

5. How long did it take Kelly to run 36 miles?

Name _____ Class _____ Date _____

7-5 • Guided Problem Solving

GPS **Student Page 264, Exercise 16:**

Choose a Method Juanita earns $5 for each subscription she sells. If she sells 25 subscriptions, will she make enough money to buy a new bicycle that costs $115? Explain. Use a table, graph, or equation to support your answer.

Understand

1. What are you being asked to do?

_____

_____

2. What are the three ways you could find the amount?

_____

Plan and Carry Out

3. What variable will you use? _____
4. What does the variable stand for? _____

_____

5. What equation can you use to represent how much she makes?

_____

6. How can you use the equation to find how much she made?

_____

7. How much does she make? _____
8. Does she have enough to buy the bicycle? _____

Check

9. Is $125 enough to buy the bicycle? _____

Solve Another Problem

10. Shawn earns $3 for each advertisement she sells for a theater's program. If he sells 41 advertisements, will he make enough money to buy a new gaming system that costs $125? Explain. Use a table, graph, or equation to support your answer.

_____

_____