Chapter 9

Family and Community Involvement (English) 338
Family and Community Involvement (Spanish) 339
Family and Community Involvement (Haitian Creole) 340
Section 9.1 341
Section 9.2 347
Section 9.3 353
Section 9.4 359
Section 9.5 365
School-to-Work 371
Graphic Organizers / Study Help 372
Financial Literacy 373
Cumulative Practice 374
Unit 4 Project with Rubric 375

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Name _____ Date _____

Chapter 9 Tables, Graphs, and Functions

Dear Family,

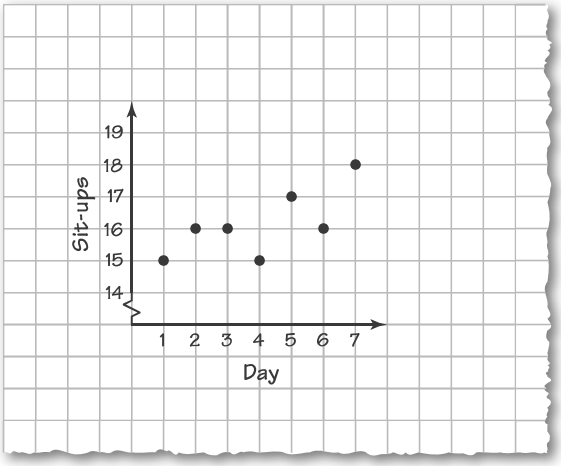
Keeping to a regular program of exercise can be a chore. Choosing an activity that you enjoy is a good start. However, we often need extra motivation. Setting goals and keeping track of your progress can be a great way to keep you going.

You and your student can use a table to keep track of your exercise program. Each day, you can record what you did. Choose the type of information you want to record. Decide whether you are counting the number of repetitions, the distance, the length of time, or the speed.

My Exercise Progress		
Day	**Miles Run**	**Sit-ups**
1	1.1	15
2	1.1	16
3	1.1	16
4	1.2	15
5	1.2	17
6	1.2	16
7	1.2	18

Help your student make a graph of the data in your table. Ask your student how the graph helps you visualize your progress. You may ask your student the following questions:

- "If we are counting repetitions, do we want the graph to go up or down?" Your student will likely say "up."
- "How about if we are counting the length of time, do we want the graph to go up or down?" Your student will likely say "down."
- "Judging from the graph, are we going to make our goals?"



You and your student may choose to compare your data. Talk about a strategy to do this. It may not be fair to directly compare the data—talk about a way to compare the graphs. How fast are you both approaching your goal?

Here's hoping you reach your goals together!

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Nombre _____ Fecha_____

Capítulo 9 Tablas, Gráficos y Funciones

Estimada Familia:

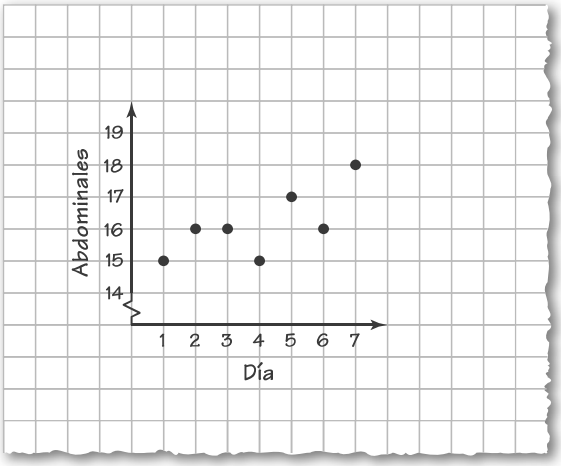
Apegarse a un programa regular de ejercicios puede ser toda una faena. Elegir una actividad que disfrute hacer es un buen comienzo. Sin embargo, con frecuencia necesitamos una motivación adicional. Establecer reglas y hacer un seguimiento de su progreso puede ser una buena manera de mantenerse activo.

Usted y su estudiante pueden usar una tabla para hacer un seguimiento de su programa de ejercicios. Cada día, pueden registrar lo que hayan hecho. Elijan el tipo de información que desean registrar. Decidan si están contando el número de repeticiones, la distancia, la duración de tiempo o la velocidad.

Mi Progreso de Ejercicios		
Día	**Millas Recorridas**	**Abdominales**
1	1.1	15
2	1.1	16
3	1.1	16
4	1.2	15
5	1.2	17
6	1.2	16
7	1.2	18

Ayude a su estudiante a hacer un gráfico de datos en su tabla. Pregunte a su estudiante cómo ayuda el gráfico a visualizar su progreso. Puede hacer a su estudiante las siguientes preguntas:

- "Si estamos contando repeticiones, ¿queremos que el gráfico vaya para arriba o abajo?" Su estudiante probablemente dirá "para arriba."
- "Y si estamos contando la duración de tiempo, ¿queremos que el gráfico vaya para arriba o abajo?" Su estudiante probablemente dirá "para abajo."
- "A partir del gráfico, ¿vamos a alcanzar nuestras metas?"



Usted y su estudiante pueden elegir comparar sus datos. Conversen acerca de una estrategia para lograr esto. Puede no ser justo comparar directamente los datos—conversen acerca de una manera para comparar los gráficos. ¿Qué tan rápido se están acercando a su meta?

¡Esperamos que alcancen sus metas juntos!

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Non _____ Dat _____

Chapít 9 Tablo, Graf, ak Fonksyon

Chè Fanmi:

Kenbe yon pwogram egzèsis regilye kapab yon kòve. Chwazi yon aktivite ou renmen se yon bon kòmansman. Sepandan, nou souvan bezwen motivasyon anplis. Tabli bi epi pran nòt pwogrè ou kapab yon bon jan pou fè ou kontinye.

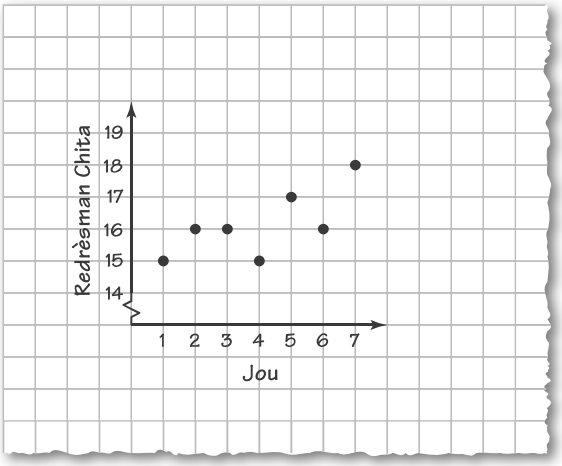
Ou menm ak elèv ou a kapab sèvi ak yon tablo pou swiv fil pwogram egzèsis ou a. Chak jou, ou kapab note sa ou fè. Chwazi tip enfòmasyon ou vle note yo. Deside si w'ap konte kantite repetisyon, distans, kantite tan, oswa vitès la.

Pwogrè Egzèsis Mwen		
Jou	**Mil Mwen Kouri**	**Redrèsman Chita**
1	1.1	15
2	1.1	16
3	1.1	16
4	1.2	15
5	1.2	17
6	1.2	16
7	1.2	18

Ede elèv ou a fè yon graf done yo nan tablo ou a.

Mande elèv ou a kijan graf la ede ou vizyalize pwogrè ou. Ou gen dwa poze elèv ou a keksyon sila yo:

- "Si n'ap konte repetisyon, èske nouvle pou graf la monte oubyen desann?" Elèv ou a ap siman di "monte".
- "E si n'ap konte kantite tan an, èske nou vle pou graf la monte oubyen desann?" Elèv ou a ap siman reponn "desann".
- "Dapre graf la, èske n'ap atenn bi nou?"



Ou menm ak elèv ou a gen dwa chwazi konpare done nou yo. Pale sou estrateji pou fè sa. Sa gen dwa pa jis pou konpare done yo dirèkteman—pale sou yon jan pou konpare graf yo. Ak ki vitès nou tou de ap pwoche bi nou?

Nou swete nou atenn bi nou yo ansanm!

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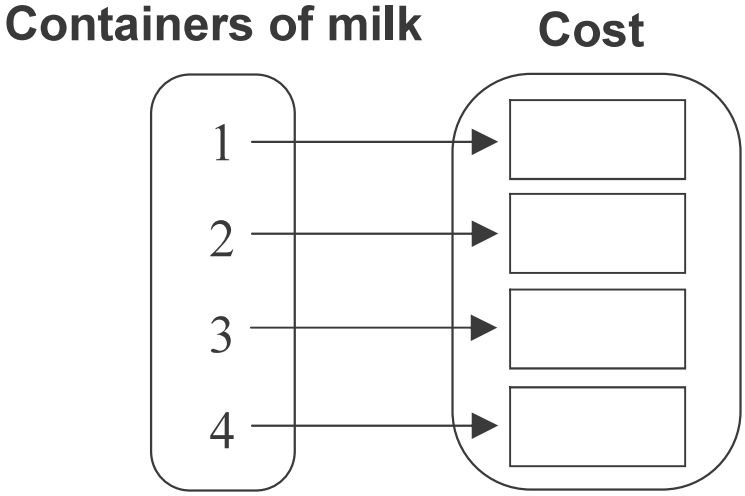
Activity 9.1 Start Thinking!

For use before Activity 9.1

What is the cost of a container of milk at your school cafeteria? Complete the diagram below, using the cost of a container of milk at your school cafeteria.



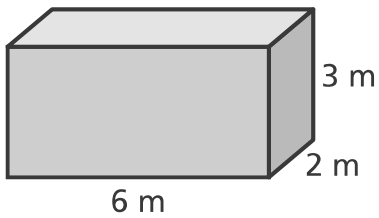
This type of diagram is called a *mapping diagram*. Why do you think it is called that?

Activity 9.1 Warm Up

For use before Activity 9.1

Find the volume of the rectangular prism.

1.



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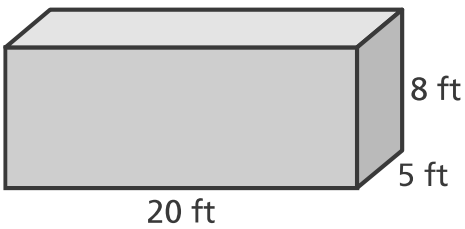

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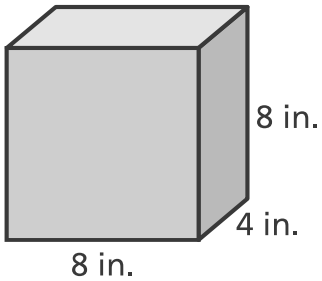

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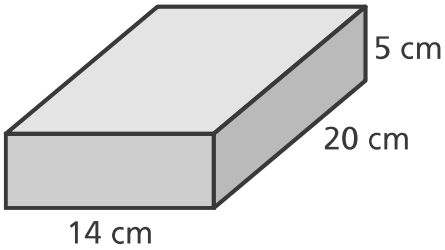

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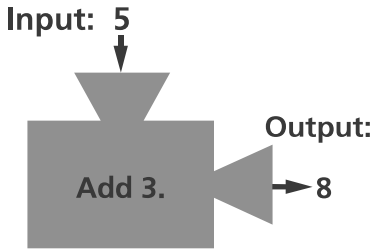
Lesson 9.1 Start Thinking!

For use before Lesson 9.1

The function machine shown is for the rule "Add 3." Using this function machine, what is the output for an input of "12"?



Guess the Function Game (2 players)

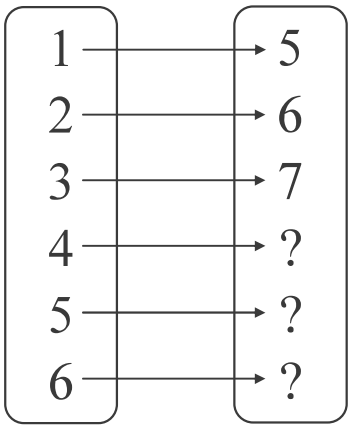
1. Decide who will be Player A and Player B.
2. Player A makes up a function rule. Do NOT tell Player B!
3. Player B gives an input number.
4. Player A uses the rule and mental math to calculate the output. Tell Player B the output.
5. Repeat Steps 3 and 4 until Player B can correctly guess the function rule.
6. Switch roles and play again.

Lesson 9.1 Warm Up

For use before Lesson 9.1

Describe the pattern in the mapping diagram. Copy and complete the diagram.

1.



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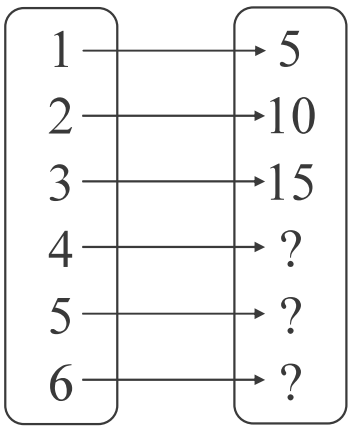

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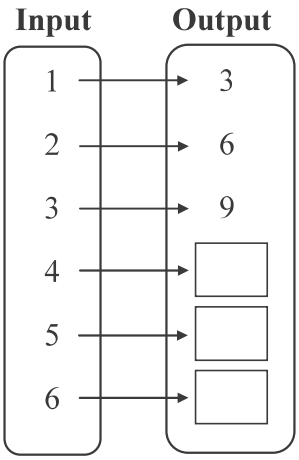
Name_____ Date_____

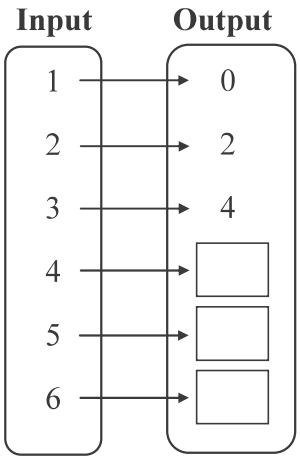
9.1 Practice A

Describe the pattern in the mapping diagram. Copy and complete the diagram.

1.

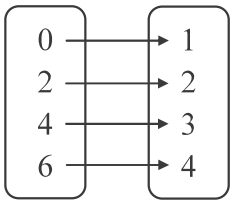


2.



List the ordered pairs shown in the mapping diagram.

3.



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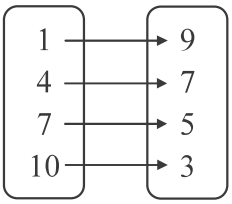

Draw a mapping diagram of the set of ordered pairs.

5. (1, 2), (3, 5), (6, 9), (10, 12)

6. (0, 7), (2, 5), (5, 8), (4, 9)

7. The table shows the number of tickets purchased and the total cost.

Tickets	Total Cost
1	$14
2	$24
3	$30
4	$32

a. Use the table to draw a mapping diagram.

b. Describe the pattern. How does the cost per ticket change as you buy more tickets?

c. Based on this pattern, how much would you expect to pay for 5 tickets?

d. Compare the costs for 3 tickets and 5 tickets. What can you suggest?

e. Explain why this pattern could not continue for up to 8 tickets.

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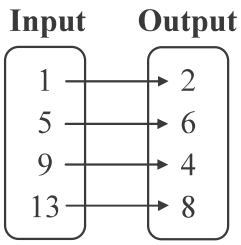
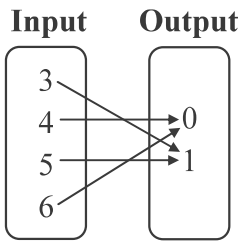
9.1 Practice B

List the ordered pairs shown in the mapping diagram.

1.



2.



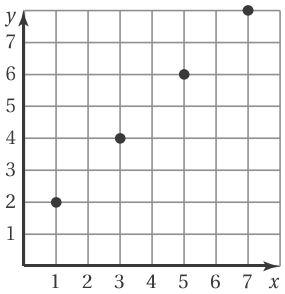
Draw a mapping diagram of the set of ordered pairs.

3. (0, 5), (4, 12), (6, 13), (7, 9)

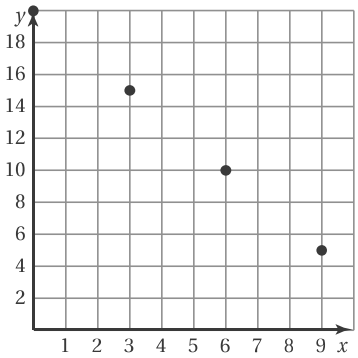
4. (1, 0), (3, 0), (5, 4), (7, 4), (9, 4)

Draw a mapping diagram for the graph. Then describe the pattern of inputs and outputs.

5.



6.



7. The table shows the cost of a collect call.

Minutes	1	2	3	4	5	6	7
Cost	\$3	\$3.25	\$3.50	?	?	?	?

a. Complete the table.

b. Draw a mapping diagram for the table.

c. List the ordered pairs.

d. Graph the ordered pairs in a coordinate plane.

e. Describe the pattern. How does the cost change as the number of minutes increases?

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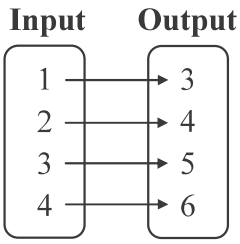
9.1 Enrichment and Extension

Identifying Functions

You learned that a *function* pairs each input with exactly one output. Tell whether the mapping diagram represents a function. Explain.

1.



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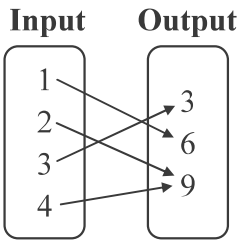
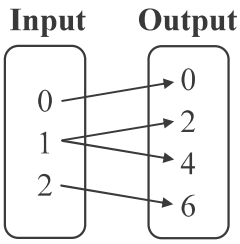


3.



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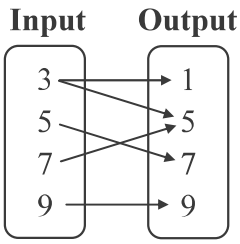
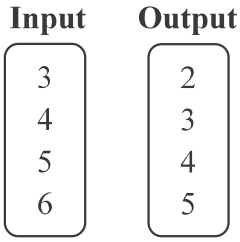
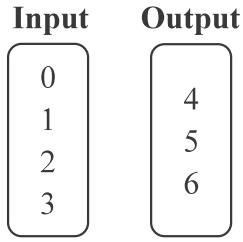


(a) Draw arrows to complete a mapping diagram of a function. (b) Draw one more arrow so that the mapping diagram does not represent a function.

5.



6.



(a) Find another point (x, y) so that the set of points represents a function.

(b) Find a point so that the set of points does not represent a function.

7. $(0, 0), (1, 1), (2, 2), (x, y)$

8. $(0, 9), (2, 8), (4, 7), (6, 6), (8, 5), (x, y)$

9. $(1, 3), (2, 3), (3, 4), (4, 4), (5, 5), (6, 5)\ (x, y)$

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Name _____ Date _____

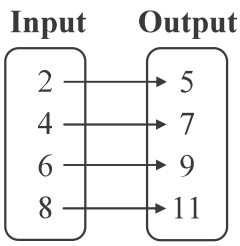
9.1 Puzzle Time

What Flowers Grow Between Your Nose And Your Chin?

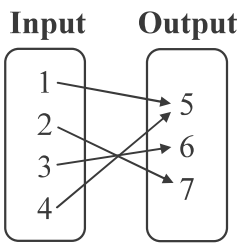
Write the letter of each answer in the box containing the exercise number.

List the ordered pairs shown in the mapping diagram.

1.



2.



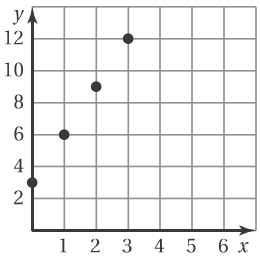
Draw a mapping diagram of the ordered pairs.

3. (2, 4), (6, 8), (9, 11), (15, 17)

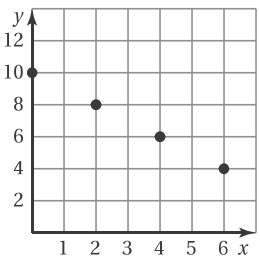
4. (2, 1), (3, 1), (5, 3), (6, 3)

Describe the pattern of inputs and outputs.

5.



6.

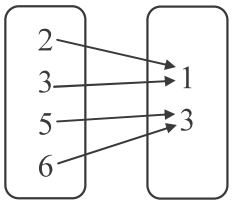


Answers

S. As each input increases by 2, the output decreases by 2.

L. (2, 5), (4, 7), (6, 9), (8, 11)

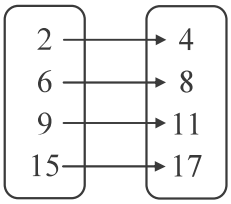
P.



M. As each input decreases by 2, the output increases by 2.

R. (2, 11), (4, 9), (6, 7), (8, 5)

I.



U. (1, 5), (2, 7), (3, 6), (4, 5)

T. As each input increases by 1, the output increases by 3.

A. (1, 5), (2, 6), (3, 7), (4, 5)

D. As each input increases by 1, the output decreases by 3.

5	2	1	3	4	6

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Activity 9.2 Start Thinking!

For use before Activity 9.2

Think about the function rule "Multiply by 7."

How can you write an equation for this function?

Explain how this equation can be used to describe the area of a rectangle with a length of 7 meters.

Activity 9.2 Warm Up

For use before Activity 9.2

1. What is the perimeter of a square with a side length of 5 inches?
2. What is the area of a triangle with a base of 15 feet and a height of 2 feet?
3. What is the circumference of a circle with a radius of 12 feet? Use 3.14 for π.
4. What is the surface area of a cube with an edge length of 5 centimeters?
5. What is the perimeter of a rectangle with a length of 9 meters and a height of 7 meters?
6. What is the area of a circle with a diameter of 10 inches? Use 3.14 for π.

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Lesson 9.2 Start Thinking!

For use before Lesson 9.2

Using two variables, write an equation for a function that describes a real-life situation. Explain the situation and what each of the variables represents.
Which variable represents input values?
Which variable represents output values?
Then make a mapping diagram that includes four different input values.

Lesson 9.2 Warm Up

For use before Lesson 9.2

Write an equation that describes the function.

1.

Input	Output
0	0
1	10
2	20
3	30

2.

Input	Output
1	17
2	18
3	19
4	20

3.

Input	Output
2	1
4	2
6	3
8	4

4.

Input	Output
20	10
40	30
60	50
80	70

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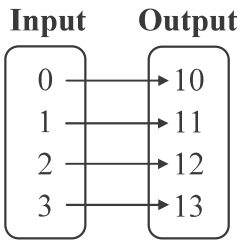
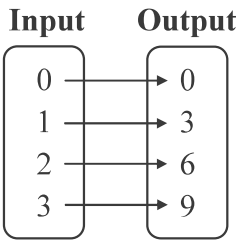
9.2 Practice A

Write an equation that describes the function.

1.



2.



Write an equation that describes the function.

3. The output is eight less than the input.

4. The output is double the input.

Find the value of *y* for the given value of *x*.

5. $y = x - 1;\ x = 5$

6. $y = 8x;\ x = 3$

7. $y = 4x - 1;\ x = 10$

8. $y = \frac{x}{2} + 5;\ x = 2$

Tell whether the ordered pair is a solution of the equation.

9. $y = x + 5;\ (2, 7)$

10. $y = 9x;\ (3, 12)$

11. $y = 2x + 3;\ (4, 12)$

12. $y = \frac{x}{2} - 4;\ (8, 0)$

13. You are running at a rate of 6 miles per hour.

a. Write an equation that relates the distance d traveled in h hours.

b. How many miles do you run in 2 hours?

14. The cost of admission for a student is \$4 less than the cost of admission for an adult.

a. Write an equation that relates the cost of admission for a student s with the cost of admission for an adult a.

b. What is the cost of admission for a student when the cost of admission for an adult is \$7.50?

c. What is the cost of admission for an adult when the cost of admission for a student is \$2?

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9.2 Practice B

Write an equation that describes the function.

1.

Input	Output
10	14
20	24
30	34
40	44

2.

Input	Output
10	5
12	6
14	7
16	8

Write an equation that describes the function.

3. The output is five times the input.

4. The output is two less than the input.

Find the value of *y* for the given value of *x*.

5. $y = 3x - 4;\ x = 2$

6. $y = \frac{x}{3} - 1;\ x = 6$

Tell whether the ordered pair is a solution of the equation.

7. $y = \frac{x}{3} - 4;\ (24, 5)$

8. $y = 2x + 7;\ (5, 17)$

9. You are traveling on a turnpike at a rate of 70 miles per hour.

a. Write an equation that relates the distance d traveled in h hours.

b. How many miles do you travel in 3.5 hours?

Find the value of *x* for the given value of *y*.

10. $y = 6x - 4;\ y = 20$

11. $y = \frac{x}{2} + 3;\ y = 8$

12. Your school club is selling popcorn at the football game. The cost of making the popcorn is \$90. You charge \$1.50 for each bag of popcorn.

a. Write an equation you can use to find the profit P for selling b bags of popcorn.

b. You will *break even* if the cost of making the popcorn equals your income. How many bags of popcorn must you sell to break even?

13. Write a function for the area A of a square given the perimeter P of the square.

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9.2 Enrichment and Extension

Function Notation

In Lesson 9.2, you wrote functions as equations in two variables, *x* and *y*, with *x* as the inputs and *y* as the outputs. Another way to write a function is to use *function notation*.

Function in *x* and *y*		Function notation
$y = 4x$	$\longrightarrow$	$f(x) = 4x$
$y = 3x + 5$	$\longrightarrow$	$f(x) = 3x + 5$

$f(x)$ is the output. The symbol $f(x)$ is read as "*f* of *x*."

Example: Find $f(4)$ for $f(x) = x + 3$

$f(x) = x + 3$	Write function.
$f(4) = 4 + 3$	Substitute 4 for *x*.
$f(4) = 7$	Add.

So, *f* of 4 is equal to 7.

Rewrite the function using function notation.

1. $y = 2x$ **2.** $y = x - 1$ **3.** $y = 4x + 7$ **4.** $\frac{3}{4}x + 5 = y$

Find $f(0)$, $f(2)$, and $f(4)$ for the function.

5. $f(x) = 8x$ **6.** $f(x) = 7 + x$ **7.** $f(x) = 5 - x$

8. $f(x) = 3x + 8$ **9.** $f(x) = 9 - 2x$ **10.** $f(x) = \frac{1}{2}x$

11. $f(x) = \frac{1}{4}x + 6$ **12.** $f(x) = 3 + 1.6x$ **13.** $f(x) = x^2 + 1$

14. Critical Thinking Give an example of a function where $f(0) = 2$ and $f(1) = 2$.

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9.2 Puzzle Time

Does It Take Longer To Run From First Base To Second, Or From Second To Third?

A	B	C	D	E	F
G	H	I	J	K	L

Complete each exercise. Find the answer in the answer column. Write the word under the answer in the box containing the exercise letter.

44 A
$y = x + 5$ TO
$y = 3x$ FROM
No THE
$y = 8x$ THIRD
9 SHORTSTOP

Write an equation that describes the function.

A.

Input	Output
0	0
1	3
2	6
3	9
4	12

B.

Input	Output
15	5
25	15
35	25
45	35
55	45

C. The output is five more than the input.

D. The output is eight times the input.

E. The output is one-third the input.

F. The output is thirteen more than four times the input.

Find the value of *y* for the given value of *x*.

G. $y = x + 7;\ x = 5$

H. $y = 6x - 4;\ x = 8$

I. $y = 2x + 4;\ x = 2.5$

J. $y = 9x - 3;\ x = 3$

Tell whether the ordered pair is a solution of the equation.

K. $y = 7x + 1;\ (0, 2)$

L. $y = \frac{x}{2} + 8;\ (24, 20)$

Yes MIDDLE
$y = \frac{1}{3}x$ BECAUSE
24 IN
12 IS
$y = x - 10$ SECOND
$y = 4x + 13$ THERE

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Activity 9.3 Start Thinking!

For use before Activity 9.3

When have you seen or used a chart or table outside of math class?

What does a table help you do with information?

Activity 9.3 Warm Up

For use before Activity 9.3

Find the percent of the number.

1. 5% of 60

2. 10% of 2

3. 12% of 25

4. 35% of 50

5. 75% of 16

6. 125% of 24

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Lesson 9.3 Start Thinking!

For use before Lesson 9.3

Describe something in real life that has an input and an output.

Lesson 9.3 Warm Up

For use before Lesson 9.3

Copy and complete the input-output table for the function.

1. $y = x - 3$

Input, *x*	10	11	12	13
Output, *y*				

2. $y = 8x$

Input, *x*	1	2	3	4
Output, *y*				

3. $y = x + 6$

Input, *x*	0	1	2	3
Output, *y*				

4. $y = \frac{x}{2}$

Input, *x*	0	2	4	6
Output, *y*				

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Name_____ Date_____

9.3 Practice A

Copy and complete the input-output table for the function.

1. $y = x + 3$

Input, *x*	1	2	3	4
Output, *y*				

2. $y = 5x$

Input, *x*	1	3	5	7
Output, *y*				

Write an equation for the function. Then copy and complete the table.

3. The output is 6 more than the input.

Input, *x*	0	1	2	3
Output, *y*				

4. The output is 3 times the input.

Input, *x*	0	2	4	6
Output, *y*				

Write an equation for the function shown by the table.

5.

Input, *x*	1	2	3	4
Output, *y*	6	7	8	9

6.

Input, *x*	1	3	5	7
Output, *y*	4	12	20	28

7. Copy and complete the table.

For each output, multiply the input by 2, then add 1.

Input, *x*	0	2	4	5		
Output, *y*	1	5	9	11	15	19

8. You are saving money to purchase a new cell phone. Your parents have agreed to pay you \$3 for each household job that you complete each week and give you an additional \$5 for the week.

a. Copy and complete the input-output table.

Number of jobs completed in a week, *x*	1	4	8	10	12
Money earned, *y*	8				

b. How is the output related to the input?

c. Write a function rule in which x is the input and y is the output.

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Name _____ Date _____

9.3 Practice B

Write an equation for the function. Then copy and complete the table.

1. The output is 7 more than the input.

Input, *x*	1	3	5	7
Output, *y*				

2. The output is 10 times the input.

Input, *x*	0	2	4	6
Output, *y*				

Write an equation for the function shown by the table.

3.

Input, *x*	0	4	8	12
Output, *y*	0	1	2	3

4.

Input, *x*	4	6	8	10
Output, *y*	1	3	5	7

5. Copy and complete the table.

For each output, multiply the input by 5, then add 3.

Input, *x*	0	1	3	4		
Output, *y*	3	8	18	23	28	43

6. You live in the Eastern Time Zone.

a. Your cousin lives in the Central Time Zone. The table shows some times in the two time zones. Copy and complete the input-output table.

Eastern Time Zone, *x*	3	5	6	8	10	11
Central Time Zone, *y*	2	4	5	7		

b. Write a function rule in which x is the input and y is the output.

c. Your grandparents live in the Mountain Time Zone. The table shows some times in the two cities. Copy and complete the input-output table.

Eastern Time Zone, *x*	3	5	6	8	10	11
Mountain Time Zone, *y*	1	3	4	6		

d. Write a function rule in which x is the input and y is the output.

e. If it is 12 P.M. in the Central Time Zone, what time is it in the Mountain Time Zone?

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9.3 Puzzle Time

What Is The Difference Between One Yard And Two Yards?

Write the letter of each answer in the box containing the exercise number.

Write an equation for the function shown by the table.

1.

Input, *x*	0	1	2	3
Output, *y*	4	5	6	7

2.

Input, *x*	0	1	2	3
Output, *y*	0	9	18	27

3.

Input, *x*	1	2	3	4
Output, *y*	11	12	13	14

4.

Input, *x*	5	7	9	11
Output, *y*	1	3	5	7

5.

Input, *x*	4	8	12	16
Output, *y*	2	4	6	8

6.

Input, *x*	0	2	4	6
Output, *y*	0	16	32	48

Answers

E. $y = x - 4$

C. $y = 9x$

N. $y = 8x$

F. $y = x + 10$

A. $y = \frac{1}{2}x$

E. $y = x + 4$

5		3	1	6	2	4

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