Vocabulary

dependent variable A variable whose value depends on the value of another quantity.

independent variable A variable whose value determines the value of another quantity.

linear equation An equation that, when graphed, forms a straight line.

Dear Family,

Throughout the next few weeks, our math class will be learning about linear equations. We will learn how to write equations and graph equations.

You can expect to see homework with real-world problems that involve tables, coordinate planes, and ordered pairs.

Here is a sample of how your child was taught to write an equation, given a table of values.

🔒 MODEL Write an Equation

Write an equation for the relationship shown in the table.

STEP 1

Think: "What is being done to each x to get y?" The y-values are less than the corresponding x-values. The equation might involve subtraction or division.

x	7	9	11	13
y	1	3	5	7

STEP 2

For the first pair of values, $y = x \div 7$. Is this true for the other pairs? $9 \div 7 \neq 3$ No, $y = x \div 7$ does not work for all pairs of values.

STEP 3

Try subtraction. For the first pair of values, $y = x - 6$. Is this true for the other pairs? $9 - 6 = 3$ $11 - 6 = 5$ $13 - 6 = 7$ Yes.

So, the equation $y = x - 6$ represents the relationship.

Tips

Writing Equations

When writing an equation to represent a relationship, be sure that the equation works for all pairs of values.

Activity

Look around your home for ideas of linear relationships (for example, 8 granola bars in 1 box). Then make a table of values. Tell what x and y represent. Write an equation and graph the relationship.

Carta para la casa

Vocabulario

variable dependiente Una variable cuyo valor depende del valor de otra cantidad.

variable independiente Una variable cuyo valor determina el valor de otra cantidad.

ecuación lineal Una ecuación que, al graficarse, forma una línea recta.

Querida familia,

Durante las próximas semanas, en la clase de matemáticas aprenderemos sobre ecuaciones lineales. También aprenderemos cómo escribir y graficar ecuaciones.

Llevaré a casa tareas con problemas del mundo real que incluyan tablas, planos cartesianos y pares ordenados.

Este es un ejemplo de la manera cómo aprenderemos a escribir una ecuación, dada una tabla de valores.

🔑 MODELO Escribir una ecuación

Escribe una ecuación para la relación que se muestra en la tabla.

PASO 1

Piensa: "¿Qué se hace en cada x para obtener y?" Los valores y son menores que sus correspondientes valores x. La ecuación podría incluir resta o división.

x	7	9	11	13
y	1	3	5	7

PASO 2

Para el primer par de valores, $y = x \div 7$. ¿Es esto verdadero para los otros pares? $9 \div 7 \neq 3$ No, $y = x \div 7$ no funciona para los otros pares de valores.

PASO 3

Intenta restar. Para el primer par de valores, $y = x - 6$. ¿Es esto verdadero para los otros pares? $9 - 6 = 3$ $11 - 6 = 5$ $13 - 6 = 7$ ¡Sí! Por tanto, la ecuación $y = x - 6$ representa la relación.

Pistas

Escribir ecuaciones

Al escribir una ecuación para representar una relación, asegúrate de que la ecuación funcione para todos los pares de valores.

Actividad

En casa, echen un vistazo para encontrar ideas que representen relaciones lineales (por ejemplo, 8 barras de granola en 1 caja). Luego, hagan una tabla de valores. Explique qué representan x y y. Escriban una ecuación y representen gráficamente la relación.

Name _____

Independent and Dependent Variables

Identify the independent and dependent variables. Then write an equation to represent the relationship between them.

1. Sandra has a coupon to save $3 off her next purchase at a restaurant. The cost of her meal c will be the price of the food p that she orders, minus $3.

The **cost of her meal** depends on the **price of her food**.

dependent variable: **c**

independent variable: **p**

equation: **c** = **p − 3**

2. An online clothing store charges $6 for shipping, no matter the price of the items. The total cost c in dollars is the price of the items ordered p plus $6 for shipping.

dependent variable: _____

independent variable: _____

equation: _____ = _____

3. Melinda is making necklaces. She uses 12 beads for each necklace. The total number of beads b depends on the number of necklaces n.

dependent variable: _____

independent variable: _____

equation: _____ = _____

4. Tanner is 2 years younger than his brother. Tanner's age t in years is 2 less than his brother's age b.

dependent variable: _____

independent variable: _____

equation: _____ = _____

5. Byron is playing a game. He earns 10 points for each question he answers correctly. His total score s equals the number of correct answers a times 10.

dependent variable: _____

independent variable: _____

equation: _____ = _____

Problem Solving · Real World

6. Maria earns $45 for every lawn that she mows. Her earnings e in dollars depend on the number of lawns n that she mows. Write an equation that represents this situation.

_____

7. Martin sells cars. He earns $100 per day, plus any commission on his sales. His daily salary s in dollars depends on the amount of commission c. Write an equation to represent his daily salary.

_____

Lesson Check

1. There are 12 boys in a math class. The total number of students s depends on the number of girls in the class g. Write an equation that represents this situation.

2. A store received a shipment of soup cans. The clerk put an equal number of cans on each of 4 shelves. Write an equation to represent the relationship between the total number of cans t and the number of cans on each shelf n.

Spiral Review

3. The formula $F = \frac{9}{5}C + 35$ gives the Fahrenheit temperature for a Celsius temperature of C degrees. Gwen measured a Celsius temperature of 35 degrees. What is this temperature in degrees Fahrenheit?

4. Write an equation to represent this sentence.

   The difference of a number n and 1.8 is 2.

5. Drew drank 4 cups of orange juice. This is $\frac{2}{5}$ of the total amount of juice that was in the container. Solve $\frac{2}{5}x = 4$ for x. How much juice was in the container?

6. Graph $x \leq {}^-4.5$ on a number line.
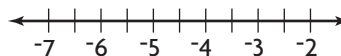
Name _____

Equations and Tables

Use the equation to complete the table.

1. $y = 6x$

Input	Output
x	y
2	**12**
5	**30**
8	**48**

2. $y = x - 7$

Input	Output
x	y
10	
15	
20	

3. $y = 3x + 4$

Input	Output
x	y
3	
4	
5	

Write an equation for the relationship shown in the table. Then find the unknown value in the table.

4.

x	2	3	4	5
y	16	?	32	40

_____

5.

x	18	20	22	24
y	9	10	?	12

_____

6.

x	8	10	12	14
y	13	15	17	?

_____

7.

x	14	17	20	23
y	5	?	11	14

_____

![Problem Solving Real World]

8. Tickets to a play cost $11 each. There is also a service charge of $4 per order. Write an equation for the relationship that gives the total cost y in dollars for an order of x tickets.

_____

9. Write an equation for the relationship shown in the table. Then use the equation to find the estimated number of shrimp in a 5-pound bag.

Weight of bag (pounds), x	1	2	3	4
Estimated number of shrimp, y	24	48	72	96

_____

Lesson Check (6.EE.9)

1. Write an equation that represents the relationship shown in the table.

x	8	10	12	14
y	4	6	8	10

2. There is a one-time fee of $27 to join a gym. The monthly cost of using the gym is $18. Write an equation for the relationship that gives the total cost y in dollars of joining the gym and using it for x months.

Spiral Review (6.EE.5, 6.EE.6, 6.EE.7, 6.EE.9)

3. Mindy wants to buy several books that each cost $10. She has a coupon for $6 off her total cost. Write an expression to represent her total cost for b books.

4. When a coupon of $1.25 off is used, the cost of a taco meal is $4.85. The equation $p - 1.25 = 4.85$ can be used to find the regular price p in dollars of a taco meal. How much does a regular taco meal cost?

5. Which of the following are solutions to the inequality $n > {}^-7$?

$n = {}^-7, n = {}^-6.9, n = {}^-7.2, n = {}^-6\frac{1}{2}$

6. Marcus sold brownies at a bake sale. He sold d dollars worth of brownies. He spent $5.50 on materials, so his total profit p can be found by subtracting $5.50 from his earnings. Which equation represents this situation?
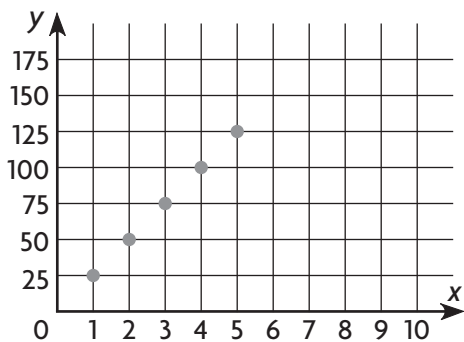
Problem Solving • Analyze Relationships

COMMON CORE STANDARD—6.EE.9
Represent and analyze quantitative relationships between dependent and independent variables.

The table shows the number of cups of yogurt needed to make different amounts of a fruit smoothie. Use the table for 1–3.

Batches, b	3	4	5	6
Cups of Yogurt, c	9	12	15	18

1. Write an equation to represent the relationship.

   The number of cups needed is __**3**__ multiplied by the number of batches,

   so __**c**__ = __**3**__ × __**b**__ .

   _____

2. How much yogurt is needed for 9 batches of smoothie?   _____

   _____

3. Jerry used 33 cups of yogurt to make smoothies.   _____
   How many batches did he make?

The table shows the relationship between Winn's age and his sister's age. Use the table for 4–6.

Winn's age, w	8	9	10	11
Winn's sister's age, s	12	13	14	15

4. Write an equation to represent the relationship. $s =$ _____

   _____

5. When Winn is 14 years old, how old will his sister be?   _____

   _____

6. When Winn's sister is 23 years old, how old will Winn be?   _____

Lesson Check (6.EE.9)

1. The table shows the total cost c in dollars of n gift baskets. What will be the cost of 9 gift baskets?

n	3	4	5	6
c	$36	$48	$60	$72

2. The table shows the number of minutes m that Tara has practiced after d days. If Tara has practiced for 70 minutes, how many days has she practiced?

d	1	3	5	7
m	35	105	175	245

Spiral Review (6.EE.3, 6.EE.7, 6.EE.8, 6.EE.9)

3. Soccer shirts cost $15 each, and soccer shorts cost $18 each. The expression $15n + 18n$ represents the total cost in dollars of n uniforms. Simplify the expression by combining like terms.

4. What is an equation that represents the relationship in the table?

x	8	10	12	14
y	4	5	6	7

5. The lowest price of an MP3 of a song in an online store is $0.99. Write an inequality that represents the price p of any MP3 in the store.

6. Marisol plans to make 9 mini-sandwiches for every 2 people attending her party. Write a ratio that is equivalent to Marisol's ratio.

Name _____

Graph Relationships

Graph the relationship represented by the table.

1.

x	1	2	3	4	5
y	25	50	75	100	125

2.

x	10	20	30	40	50
y	350	300	250	200	150
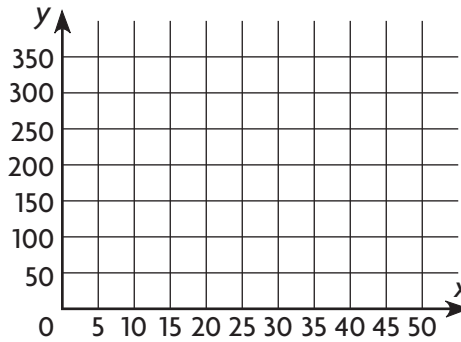
Graph the relationship represented by the table to find the unknown value of y.

3.

x	3	4	5	6	7
y	8	7		5	4
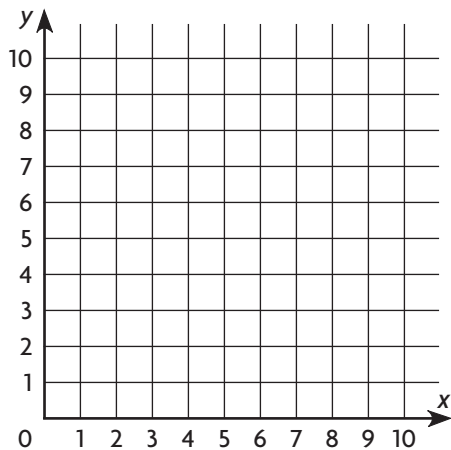
4.

x	1	3	5	7	9
y	1		3	4	5

Problem Solving Real World
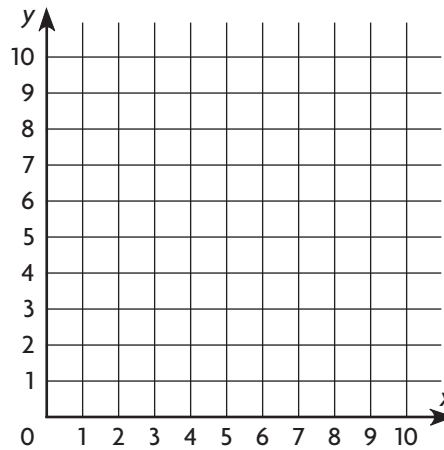
5. Graph the relationship represented by the table.

DVDs Purchased	1	2	3	4
Cost ($)	15	30	45	60

6. Use the graph to find the cost of purchasing 5 DVDs.

_____

Cost of DVDs
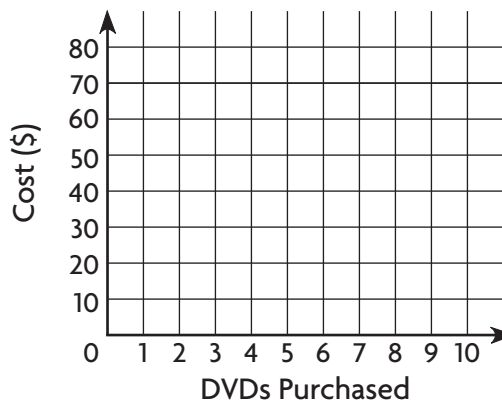
Lesson Check (6.EE.9)

1. Mei wants to graph the relationship represented by the table. Which ordered pair is a point on the graph of the relationship?

T-shirts purchased, x	1	2	3	4
Cost ($), y	8	16	24	32

_____

_____

_____

_____

2. An online bookstore charges $2 to ship any book. Cole graphs the relationship that gives the total cost y in dollars to buy and ship a book that costs x dollars. Name an ordered pair that is a point on the graph of the relationship.

_____

_____

_____

_____

_____

Spiral Review (6.EE.3, 6.EE.7, 6.EE.8, 6.EE.9)

3. Write an expression that is equivalent to $6(g + 4)$.

_____

4. There are 6 girls in a music class. This represents $\frac{3}{7}$ of the entire class. Solve $\frac{3}{7} s = 6$ to find the number of students, s, in the class.

_____

5. Graph $n > {}^-2$ on a number line.
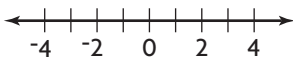
6. Sam is ordering lunch for the people in his office. The table shows the cost of lunch based on the number of people. How much will lunch cost for 35 people?

Number of people, n	5	10	15	20
Cost ($), c	40	80	120	160

_____

Name _____

Equations and Graphs

Graph the linear equation.

1. $y = x - 3$

x	y
5	2
6	**3**
7	**4**
8	**5**
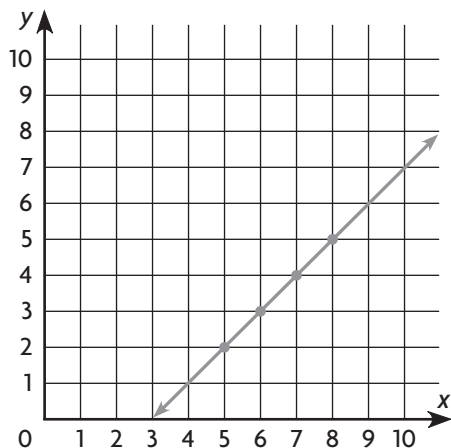
2. $y = x \div 3$
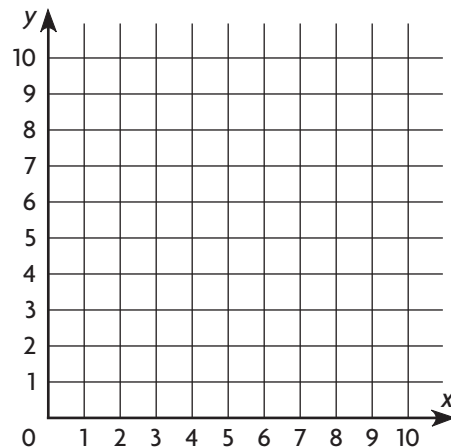
Write a linear equation for the relationship shown by the graph.

3.

(7, 8)
(5, 6)
(3, 4)
(1, 2)

_____

4.
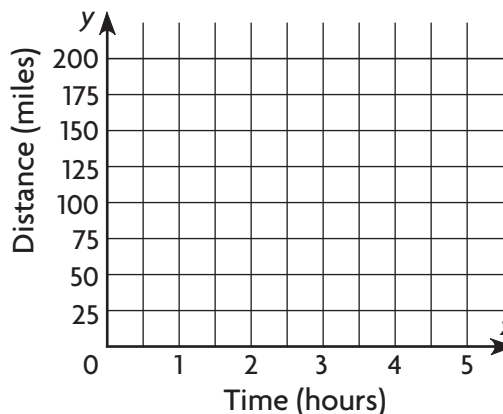
(2, 8)
(1.5, 6)
(1, 4)

_____

Problem Solving *Real World*
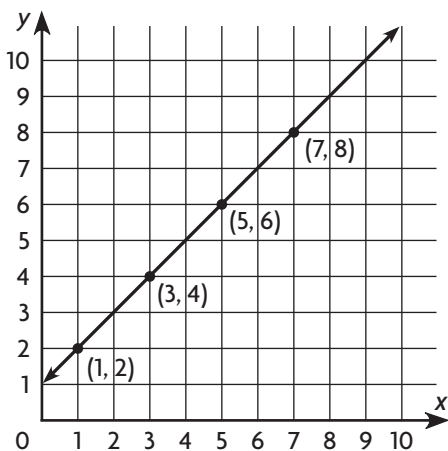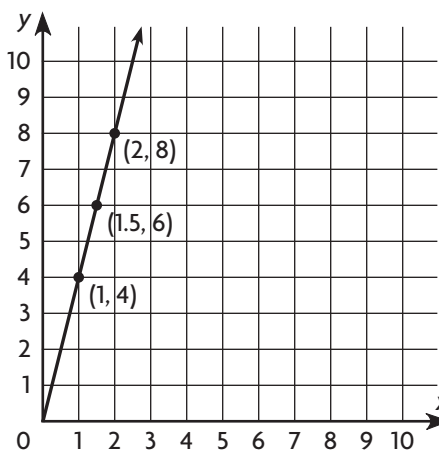
5. Dee is driving at an average speed of 50 miles per hour. Write a linear equation for the relationship that gives the distance y in miles that Dee drives in x hours.
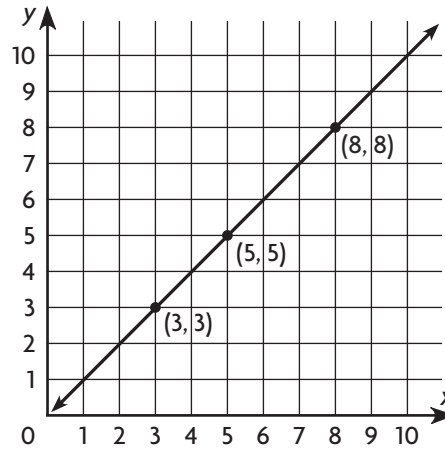
_____

6. Graph the relationship from Exercise 5.

Dee's Distance

Distance (miles)

Time (hours)

Lesson Check

1. A balloon rises at a rate of 10 feet per second. What is the linear equation for the relationship that gives the height y in feet of the balloon after x seconds?

2. Write the linear equation that is shown by the graph.

Spiral Review

3. Of the three expressions shown, which two are equivalent?

$$3 + 2(9 + 2n) \qquad 7(3 + 4n) \qquad 21 + 4n$$

4. Which of the following are solutions of $j \geq 0.6$?

$$j = 1, j = -0.6, j = \frac{3}{5}, j = 0.12, j = 0.08$$

5. Red grapes cost $2.49 per pound. Write an equation that shows the relationship between the cost c and the number of pounds of grapes p.

6. It costs $8 per hour to rent a bike. Niko graphs this relationship using x for number of hours and y for total cost. Which ordered pair is a point on the graph of the relationship?