Chapter 8 - Equations and Inequalities

8.2 Writing Linear Equations

Lesson Objective:

- Express the relationship between two quantities as a linear equation.
- Use a table or graph to represent a linear equation.

Vocabulary:

linear equation:

independent variable:

dependent variable:

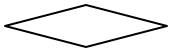
L) Write a linear equation to represent a given situation.

a) Caleb is x years old. His sister is 10 years older than he is. If his sister is y years old, write an equation that relates their two ages.

NOTE: In the equation, x is called the _____ variable and y is called the _____ variable because the value of y depends on the value of x.

Writing y as an expression using x is called expressing y in terms of x.

b) A rhombus has sides of length ***r*** centimeters. If the perimeter of the rhombus is ***P*** centimeters, express P in terms of r.



Guided Practice

1. Isaiah has h baseball cards. Miguel has 7 more baseball cards than Isaiah.
   a) Write an expression for the number of baseball cards that Miguel has in terms of h.

   b) If Miguel has k baseball cards, express k in terms of h.

   c) State the independent and dependent variables.
      Independent variable:
      Dependent variable:

Write an equation for each of the following. Then state the independent and dependent variables for each equation.

2. Hannah took p minutes to jog around a park. Sofia took 12 minutes longer to jog around the park. If Sofia took t minutes to jog around the part, express t in terms of p.

   Independent:_____ Dependent:_____

3. A bouquet of roses costs $30. A bouquet of tulips costs m dollars less. If the costs of one bouquet of tulips is n dollars, express n in terms of m.

   Independent:_____ Dependent:_____

4. Nathan has 7 boxes of marbles. Each box contains b marbles. If he has c marbles altogether, express c in terms of b.

   Independent:_____ Dependent:_____

5. A motel charges Mr. Kim x dollars for his stay. Mr. Kim stayed at the motel for 12 nights. If the rate per night for a room is y dollars, express y in terms of x.

   Independent:_____ Dependent:_____

L) Use tables and graphs to represent linear equations.

a) The length of a rectangular picture frame is 5 inches longer than its width. Write an equation to show how its width and length are related.

w =

l=

Equation _____

Width (w in.)		Length (l in.)
1		
2		
3		
4		
5		

The length is _____ on the width.

- The width (w) is the independent variable, and the length (l) is the dependent variable.

Horizontal axis shows the width of the picture frame.
Vertical axis shows the length of the picture frame.

Dimensions of a Picture Frame

Width (in.)

All linear equations have graphs that are lines. The graph of a linear equation contains all the ordered pairs that make the equation true.

b) Each can of pain contains 5 gallons of paint. Write an equation to show the relationship between the number of cans and the volume of paint.

v =

c =

Equation:

- The volume of paints depends on the number of cans of paint. The number of cans ***c*** is the independent variable, and the volume of paint ***v*** is the dependent variable.

# of Cans (c)	1	2	3	4	5
Volume of Paint (v gal)					

Volume of Paint

Number of cans of paint

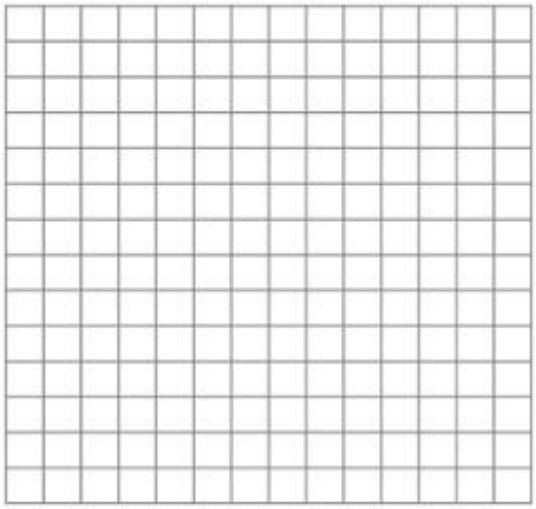
Guided Practice
Complete the table. Then use the table to answer the questions.

6) The width of a rectangular tank is 2 meters less than its length.

a) If the length is p meters and the width is q meters, write an equation relating p and q.

Length (p meters)	3	4	5	6	7	8
Width (q meters)						

b.) Use the data from the table to plot the points on a coordinate plane. Connect the points with a line.



c) The point (5.5, 3.5) is on the line you drew in b. Does this point make sense in the situation?

Complete each table. Then express the relationship between the two variables as an equation.

7) Paul and Lee went to the library to borrow some books. Paul borrowed 6 more books than Lee.

# of books Lee borrowed (x)	1	2	3	4	5
# of books Paul borrowed (y)	7		9		

EQUATION:

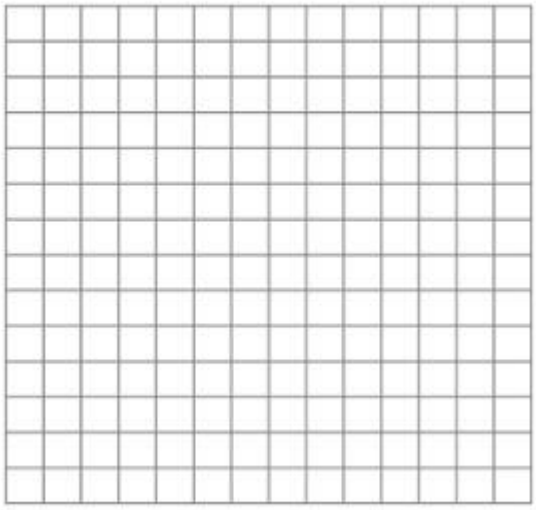
8) At a crafts store, Zoey bought some boxes of red beads and some boxes of blue beads. The number of boxes of red beads was 4 times the number of boxes of blue beads.

# of boxes of blue beads (b)	2	3	4	5	6
# of boxes of red beads (r)	8				24

EQUATION:

9) Use the data in the table to plot points on a coordinate plane. Connect the points to form a line. Then write an equation to show the relationship between the variables.

Time Taken (t hours)	1	2	3	4	5	6
Distance traveled (d miles)	50	100	150	200	250	300



EQUATION: