

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

1. $(4, 4); y = -x + 8$

$4 = -4 + 8$
 $4 = 4$ yes

3. $(3, 2); x + 6y = 13$

$3 + 6(2) = 13$
 $3 + 12 = 13$
 $15 \neq 13$ No

5. $(-1, -2); y = 3x$

7. $(0, -1); y = 4x - 1$

2. $(-2, 3); y = -2x - 1$

$3 = -2(-2) - 1$
 $3 = 4 - 1$ yes
 $3 = 3$

4. $(1, 3); 4x - 3y = -5$

$4(1) - 3(3) = -5$
 $4 - 9 = -5$
 $-5 = -5$ yes

6. $(-3, 9); y = -3x$

8. $(-2, 8); y = -2x - 1$

Warm Up

Write an equation in point-slope form of the line that passes through the given point and has the given slope.

1. $(1, 2); m = 1$

$y - 2 = 1(x - 1)$
 $y - 2 = x - 1$

2. $(8, -5); m = -5$

$y - (-5) = -5(x - 8)$
 $y + 5 = -5x + 40$

3. $(8, 1); m = \frac{1}{4}$

4. $(-5, 5); m = 4$

5. $(4, 0); m = 5$

6. $(-5, 3); m = 1$

7. $(8, 1); m = \frac{2}{3}$

8. $(7, -2); m = -\frac{4}{5}$

Cumulative Warm Up

Essential Question

How can you solve a system of linear equations?

• To be proficient in math, you need to identify important quantities in real-life problems and map their relationships using tools such as diagrams, tables, and graphs.

Essential Question

* Students should understand the coordinate point and that it is always stated as (x, y)

* Student should be able to plug the x and y coordinate into the equation and solve.

5-8 Student practice

point slope form:

$y - y_1 = m(x - x_1)$

* Student will substitute values and simplify. If simplified completely they will end in slope intercept form:

$y = mx + b$

what you will learn:

* Check solutions of systems of equations

* Solve systems of linear equations by graphing

* Use systems of linear equations to solve real-life problems.

Work with a partner.

Your family opens a bed-and-breakfast. They spend \$600 preparing a bedroom to rent. The cost to your family for food and utilities is \$15 per night. They charge \$75 per night to rent the bedroom.

a. Write an equation that represents the costs.

Cost, C (in dollars) = \$15 per night \cdot Number of nights, x + \$600

b. Write an equation that represents the revenue (income).

Revenue, R (in dollars) = \$75 per night \cdot Number of nights, x

c. A set of two (or more) linear equations is called a **system of linear equations**. Write the system of linear equations for this problem.

Exploration 1

- a {
- Will the cost to prepare the room change or is it constant?
 - How much does it cost for food/utilities? Does the amount earned depend on length of stay?
- b {
- Does their total revenue depend on length of stay?

$C = 15x + 600$ $R = 75x$

Work with a partner. Use the cost and revenue equations from Exploration 1 to determine how many nights your family needs to rent the bedroom before recovering the cost of preparing the bedroom. This is the *break-even point*.

a. Copy and complete the table.

x (nights)	0	1	2	3	4	5	6	7	8	9	10	11
C (dollars)												
R (dollars)												

b. How many nights does your family need to rent the bedroom before breaking even?

Exploration 2a-b

* Student should see that we will calculate Cost and Revenue by substituting the number of nights (x) into the equation. This will require multiple calculations

c. In the same coordinate plane, graph the cost equation and the revenue equation from Exploration 1.

d. Find the point of intersection of the two graphs. What does this point represent?

How does this compare to the break-even point in part (b)? Explain.

Exploration 2c-d

c. Demonstrate how to graph both pieces of data on the same grid

d. discuss the point where the two lines cross.

Tell whether the ordered pair is a solution of the system of linear equations.

a. (2, 5); $x + y = 7$ Equation 1
 $2x - 3y = -11$ Equation 2
 Yes

b. (-2, 0); $y = -2x - 4$ Equation 1
 $y = x + 4$ Equation 2
 No

Handwritten work for (2, 5):
 $2 + 5 = 7$
 $2(2) - 3(5) = -11$
 $7 = 7$
 $4 - 15 = -11$
 $-11 = -11$

Handwritten work for (-2, 0):
 $0 = -2(-2) - 4$
 $0 = 4 - 4$
 $0 = 0$

Example 1

Tell whether the ordered pair is a solution of the system of linear equations.

1. (1, -2); $2x + y = 0$
 $-x + 2y = 5$

2. (1, 4); $y = 3x + 1$
 $y = -x + 5$

Monitoring Progress 1-2

Core Concept

Solving a System of Linear Equations by Graphing

Step 1 Graph each equation in the same coordinate plane.

Step 2 Estimate the point of intersection.

Step 3 Check the point from Step 2 by substituting for x and y in each equation of the original system.

Core Concept

Systems of linear equations:
 a set of two or more linear equations in the same variables

Solution of a system of linear equations: two variables in an ordered pair that is a solution of each equation in a system.

* Students should be able to define the x and y values from the coordinate

* Students should be able to substitute and solve each equation using the x and y coordinate.

* the solution to a system of linear equations is the point of intersection of the graphs of the equations.

Solve the system of linear equations by graphing.

$$y = -2x + 5 \text{ Equation 1}$$

$$y = 4x - 1 \text{ Equation 2}$$

* Insert a graph to solve

Example 2

Solve the system of linear equations by graphing.

$$3. y = x - 2$$

$$4. y = \frac{1}{2}x + 3$$

$$5. 2x + y = 5$$

$$y = -x + 4$$

$$y = -\frac{3}{2}x - 5$$

$$3x - 2y = 4$$

* Students will need graph paper

Monitoring Progress 3-5

A roofing contractor buys 30 bundles of shingles and 4 rolls of roofing paper for \$1040. In a second purchase (at the same prices), the contractor buys 8 bundles of shingles for \$256. Find the price per bundle of shingles and the price per roll of roofing paper.

$$30x + 4y = 1040$$

$$8x = 256$$

Example 3

* when equations are given in the form of $y = mx + b \rightarrow$ slope-intercept form, you can graph by finding the y-intercept and then counting the slope out

* Remember slope is

$$\frac{\text{Rise}}{\text{Run}} = \frac{y}{x}$$

* have students solve - ask questions - show all work.

* write equations - what do we need to ask as we build the equations?

* solve by graphing - review how to find x and y intercepts.

6. You have a total of 18 math and science exercises for homework. You have six more math exercises than science exercises. How many exercises do you have in each subject?

$$\text{math} = x \quad \text{science} = y$$

$$x + y = 18$$

$$x + 6 = 18$$

Monitoring Progress 6

Phone Call: Write a brief script for a phone conversation with a friend who was not in class today. Explain what a system of linear equations is and how you solve a system of linear equations by graphing.

Closure

Additional work:

For the first tour on Monday, a museum sells 4 Children's tickets and 8 adult tickets for \$128.

For the second tour, the museum sells 6 adult tickets for \$72. Find the price of one Children's ticket and one adult ticket.

$$\begin{aligned} 4x + 8y &= 128 \\ 6y &= 72 \end{aligned}$$

$$\begin{aligned} \text{Child tickets} &= \$8 \\ \text{Adult ticket} &= \$12 \end{aligned}$$

- Set up problem - equations
- Solve by graphing

