# More Solutions to Linear Equations

Let's find solutions to more linear equations.

## 14.1 Coordinate Pairs

For each equation choose a value for $x$ and then find the corresponding $y$-value that makes that equation true.

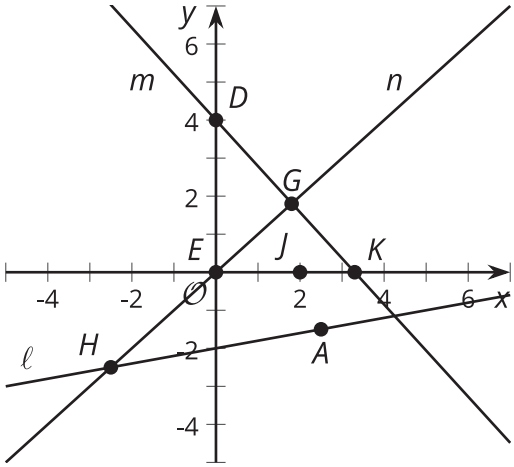
1. $6x = 7y$

2. $5x + 3y = 9$

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

# 14.2 Solutions in the Coordinate Plane

Here are graphs representing three linear relationships. These relationships could also be represented by equations.




Decide if each statement is true or false. Explain your reasoning.

1. The point $(4, 0)$ represents a solution to the equation for line $m$.

2. The coordinates of the point $G$ make both the equation for line $m$ and the equation for line $n$ true.

3. $(2, 0)$ makes the equation for line $m$ and the equation for line $n$ true.

4. There is not a solution to the equation for line $\ell$ that has $y = 0$.

5. The coordinates of point $H$ are a solution to the equation for line $\ell$.

6. There are exactly two solutions to the equation for line $\ell$.

7. There is a point whose coordinates make the equations of all three lines true.

8. $x = 0$ is a solution to the equation for line $n$.

Discuss your thinking with your partner. If you disagree, work to reach an agreement.

# 14.3 I'll Take an X, Please

Your teacher will give you a set of cards. One partner has 6 cards labeled A through F and one partner has 6 cards labeled a through f. Cards with the same letter, for example Cards A and a, have an equation on one card and a coordinate pair $(x, y)$ that makes the equation true on the other card. Take turns asking your partner for either the $x$- or $y$-coordinate value and using it to solve your equation for the other value.

1. The partner with the equation asks the partner with a solution for either the $x$-value or the $y$-value.
2. The partner with the equation uses this value to find the other value, explaining each step as they go.
3. The partner with the coordinate pair checks their partner's work. If the coordinate pair does not match, both partners should look through the steps to find and correct any errors. Otherwise, both partners move onto the next set of cards.

Keep playing until you have finished all the cards.

### Are you ready for more?

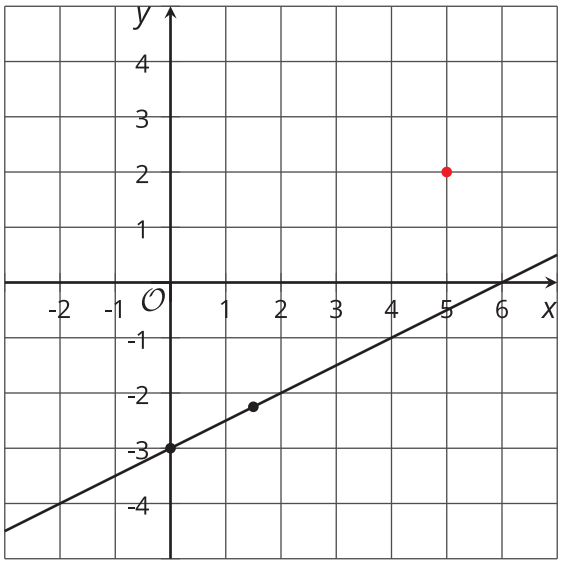
Consider the equation $ax + by = c$, where $a$, $b$, and $c$ are positive numbers.

1. Find the coordinates of the $x$- and $y$-intercepts of the graph of the equation.

2. Find the slope of the graph.

## Lesson 14 Summary

Consider the graph of the linear equation $2x - 4y = 12$.




Since $(0, -3)$ is a point on the graph of the equation, $(0, -3)$ is a solution to the equation. Any point not on the line is not a solution to the equation.

Sometimes the coordinates of a solution cannot be determined exactly by looking at the graph. For example, when $x = 1.5$, the $y$-value is somewhere between -2 and -3. If we have a value for one of the variables, we can use the equation to figure out the value of the other variable.

$$\begin{aligned} 2x - 4y &= 12 \\ 2(1.5) - 4y &= 12 \\ 3 - 4y &= 12 \\ -4y &= 9 \\ y &= -\frac{9}{4} \text{ or } -2\frac{1}{4} \end{aligned}$$

The equation can also be used to check whether a pair of values is a solution to the equation by seeing if the values make the equation true. For example, since the values $x = 5$ and $y = 2$ do not make the equation true, then the point $(5, 2)$ is not a solution and does not lie on the line.


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