# 3.2 Exercises

## Concept Check

**Fill-in-the-Blank.** Complete each sentence using information found in this section.

1. If 0 is substituted for $x$ in a linear equation and the resulting equation is solved for $y$, the result will be the ___-intercept.
2. If 0 is substituted for $y$ in a linear equation and the resulting equation is solved for $x$, the result will be the ___-intercept.
3. The solution set for linear equations is a/an _____ set of ordered pairs.
4. The standard form of a linear equation is _____.
5. The graph of every linear equation is a/an _____.
6. The graph of a line is determined by ___ points.

**True/False.** Determine whether each statement is true or false. If a statement is false, explain how it can be changed so the statement will be true. (**Note:** There may be more than one acceptable change.)

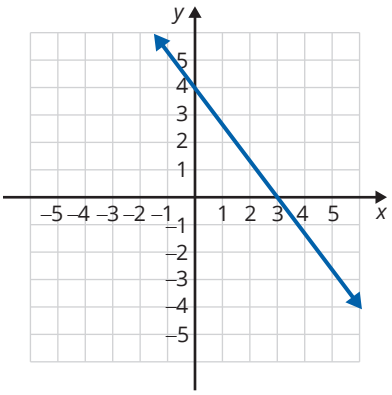
7. The $y$-intercept is the point where a line crosses the $y$-axis.
8. The terms ordered pair and point are used interchangeably.
9. A horizontal line does not have a $y$-intercept.
10. All $x$-intercepts correspond to an ordered pair of the form $(0, y)$.

## Practice

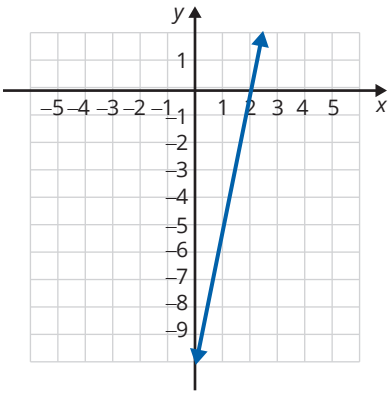
Use your knowledge of $y$-intercepts and $x$-intercepts to match each of the following equations with its graph.

1. $4x + 3y = 12$
2. $4x - 3y = 12$
3. $x + 2y = 8$
4. $-x + 2y = 8$
5. $x + 4y = 0$
6. $5x - y = 10$

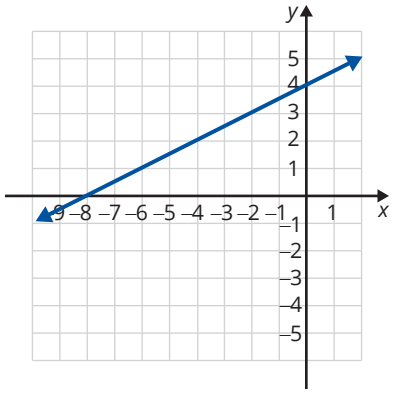
**a.**



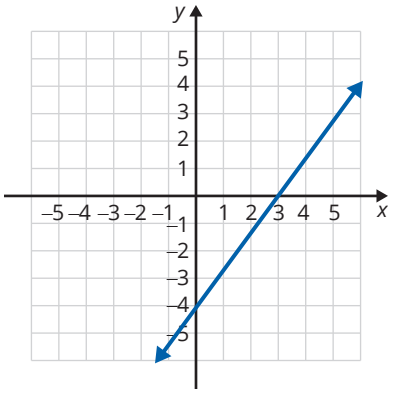

**b.**



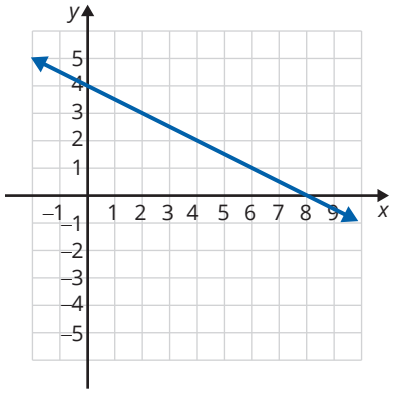
**c.**



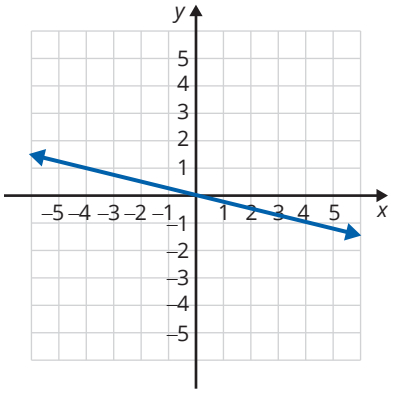

**e.**




**d.**




**f.**




Graph each linear equation by locating at least two ordered pairs that satisfy the given equation. See Examples 1 through 3.

**7.** $x + y = 3$

**8.** $x + y = 4$

**9.** $y = x$

**10.** $2y = x$

**11.** $2x + y = 0$

**12.** $x = 1$

**13.** $3x + 2y = 0$

**14.** $2x + 3y = 7$

**15.** $x + 2 = 0$

**16.** $4x + 3y = 11$

**17.** $3x - 4y = 12$

**18.** $2x - 5y = 10$

**19.** $y + 1 = 0$

**20.** $y = 4x + 4$

**21.** $y = x + 2$

**22.** $x - 4 = -1$

**23.** $3y = 2x - 4$

**24.** $y = -3$

**25.** $4x = 3y + 8$

**26.** $3x + 5y = 6$

**27.** $2x + 7y = -4$

**28.** $2x + 3y = 1$

**29.** $x + 5 = 6$

**30.** $5x - 3y = -1$

**31.** $5x - 2y = 7$

**32.** $y - 3 = 1$

**33.** $3x + 4y = 7$

**34.** $\frac{2}{3}x - y = 4$

**35.** $x + \frac{3}{4}y = 6$

**36.** $2x + \frac{1}{2}y = 3$

**37.** $y + 2 = 3$

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

**39.** $5x = y + 2$

**40.** $4x = 3y - 5$

Graph each linear equation by locating the *x*-intercept and the *y*-intercept. See Examples 4 through 6.

**41.** $x + y = 6$

**42.** $x + y = 4$

**43.** $x - 2y = 8$

**44.** $x - 3y = 6$

**45.** $4x + y = 8$

**46.** $x + 3y = 9$

**47.** $x - 4y = -6$

**48.** $x - 6y = 3$

**49.** $y = 4x - 10$

**50.** $y = 2x - 9$

**51.** $3x - 2y = 6$

**52.** $5x + 2y = 10$

**53.** $2x + 3y = 12$

**54.** $3x + 7y = -21$

**55.** $3x - 7y = -21$

**56.** $3x + 2y = 15$

**57.** $5x + 3y = 7$

**58.** $2x + 3y = 5$

**59.** $y = \frac{1}{2}x - 4$

**60.** $y = -\frac{1}{3}x + 3$

**61.** $\frac{2}{3}x - 3y = 4$

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

**63.** $\frac{1}{2}x - \frac{3}{4}y = 6$

**64.** $\frac{2}{3}x + \frac{4}{3}y = 8$

## Applications

Solve.

**65.** The amount of potassium in a clear bottle of a popular sports drink declines over time when exposed to the UV lights found in most grocery stores. The amount of potassium in a container of this sports drink is given by the equation $y = -30x + 360$, where $y$ represents the mg of potassium remaining after $x$ days on the shelf. Find both the *x*-intercept and *y*-intercept, and interpret the meaning of each in the context of this problem.

**66.** Mr. Adler has found that the grade each student gets in his Introductory Algebra course directly correlates with the amount of time spent doing homework and is represented by the equation $y = 7x + 30$, where $y$ represents the numerical score the student receives on an exam (out of 100 points) after spending $x$ hours per week doing homework. Find the *y*-intercept and interpret its meaning in this context.

**67.** Barbara's Bombtastic Bakery is donating cookies to a charity bake sale. The bakery decides to donate chocolate chip cookies and peanut butter cookies by the dozen, and they want to donate a total of 30 dozen cookies. To determine the possible combinations, the bakery uses the equation $C + P = 30$, where $C$ is the number of dozens of chocolate chip cookies and $P$ is the number of dozens of peanut butter cookies.

**a.** Find the intercepts of the given equation.

**b.** Graph the equation using the intercepts.

**c.** Are there any solutions to the equation that do not make sense in the context of the problem? Explain why.

**d.** If Barbara's Bombtastic Bakery decides to donate 16 dozen peanut butter cookies, how many dozen chocolate chip cookies will be donated?

**68.** Ibuprofen can be given to a child to treat a fever. For a fever lower than 102.5 °F, the recommended dosage is 2.2 milligrams per pound of body weight. This can be modeled by the equation $D = 2.2w$, where $D$ is the dosage of ibuprofen in milligrams and $w$ is the weight of the child in pounds.

**a.** Create a table to determine several coordinate pairs that satisfy the equation.

**b.** Graph the equation using the coordinate pairs from part a.

**c.** Are there any solutions from the graph that do not make sense in the context of the problem? Explain why.

**d.** How much ibuprofen should be given to a child that weighs 45 pounds?

**69.** Mason purchased a card game for $20. The 5-card expansion packs cost $1 per pack. Mason wants to keep track of how much money he spends on the game, so he creates the equation $C = 20 + 1n$, where $C$ is the total cost in dollars and $n$ is the number of expansion packs purchased.

**a.** Create a table to determine several coordinate pairs that satisfy the equation.

**b.** Graph the equation using the coordinate pairs from part a.

**c.** Are there any solutions from the graph that do not make sense in the context of the problem? Explain why.

**d.** If Mason buys 37 expansion packs, what will the total cost be?

## Writing & Thinking

**70.** Explain, in your own words, why it is sufficient to find the $x$-intercept and $y$-intercept to graph a line (assuming that they are not the same point).

**71.** Explain, in your own words, how you can determine if an ordered pair is a solution to an equation.