5 Chapter Review

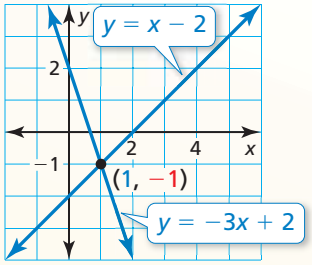
Dynamic Solutions available at *BigIdeasMath.com*

5.1 Solving Systems of Linear Equations by Graphing *(pp. 235–240)*

Solve the system by graphing. $y = x - 2$ Equation 1
$y = -3x + 2$ Equation 2

Step 1 Graph each equation.

Step 2 Estimate the point of intersection.
The graphs appear to intersect at $(1, -1)$.



Step 3 Check your point from Step 2.

Equation 1

$y = x - 2$
$-1 \stackrel{?}{=} 1 - 2$
$-1 = -1$ ✓

Equation 2

$y = -3x + 2$
$-1 \stackrel{?}{=} -3(1) + 2$
$-1 = -1$ ✓

▶ The solution is $(1, -1)$.

Solve the system of linear equations by graphing.

1. $y = -3x + 1$
$y = x - 7$

2. $y = -4x + 3$
$4x - 2y = 6$

3. $5x + 5y = 15$
$2x - 2y = 10$

5.2 Solving Systems of Linear Equations by Substitution *(pp. 241–246)*

Solve the system by substitution. $-2x + y = -8$ Equation 1
$7x + y = 10$ Equation 2

Step 1 Solve for y in Equation 1.

$y = 2x - 8$ Revised Equation 1

Step 2 Substitute $2x - 8$ for y in Equation 2 and solve for x.

$7x + y = 10$ Equation 2
$7x + (2x - 8) = 10$ Substitute $2x - 8$ for y.
$9x - 8 = 10$ Combine like terms.
$9x = 18$ Add 8 to each side.
$x = 2$ Divide each side by 9.

Step 3 Substituting 2 for x in Equation 1 and solving for y gives $y = -4$.

▶ The solution is $(2, -4)$.

Solve the system of linear equations by substitution. Check your solution.

4. $3x + y = -9$
$y = 5x + 7$

5. $x + 4y = 6$
$x - y = 1$

6. $2x + 3y = 4$
$y + 3x = 6$

7. You spend \$20 total on tubes of paint and disposable brushes for an art project. Tubes of paint cost \$4.00 each and paintbrushes cost \$0.50 each. You purchase twice as many brushes as tubes of paint. How many brushes and tubes of paint do you purchase?

5.3 Solving Systems of Linear Equations by Elimination *(pp. 247–252)*

Solve the system by elimination. $4x + 6y = -8$ Equation 1; $x - 2y = -2$ Equation 2

Step 1 Multiply Equation 2 by 3 so that the coefficients of the y-terms are opposites.

$4x + 6y = -8$ → $4x + 6y = -8$ Equation 1

$x - 2y = -2$ — Multiply by 3. → $3x - 6y = -6$ Revised Equation 2

Step 2 Add the equations.

$4x + 6y = -8$ Equation 1

$3x - 6y = -6$ Revised Equation 2

$7x = -14$ Add the equations.

Step 3 Solve for x.

$7x = -14$ Resulting equation from Step 2

$x = -2$ Divide each side by 7.

Step 4 Substitute -2 for x in one of the original equations and solve for y.

$4x + 6y = -8$ Equation 1

$4(-2) + 6y = -8$ Substitute -2 for x.

$-8 + 6y = -8$ Multiply.

$y = 0$ Solve for y.

Check

Equation 1

$4x + 6y = -8$

$4(-2) + 6(0) \stackrel{?}{=} -8$

$-8 = -8$ ✓

Equation 2

$x - 2y = -2$

$(-2) - 2(0) \stackrel{?}{=} -2$

$-2 = -2$ ✓

▶ The solution is $(-2, 0)$.

Solve the system of linear equations by elimination. Check your solution.

8. $9x - 2y = 34$
$5x + 2y = -6$

9. $x + 6y = 28$
$2x - 3y = -19$

10. $8x - 7y = -3$
$6x - 5y = -1$

5.4 Solving Special Systems of Linear Equations *(pp. 253–258)*

Solve the system. $4x + 2y = -14$ Equation 1; $y = -2x - 6$ Equation 2

Solve by substitution. Substitute $-2x - 6$ for y in Equation 1.

$4x + 2y = -14$ Equation 1

$4x + 2(-2x - 6) = -14$ Substitute $-2x - 6$ for y.

$4x - 4x - 12 = -14$ Distributive Property

$-12 = -14$ ✗ Combine like terms.

▶ The equation $-12 = -14$ is never true. So, the system has no solution.

Solve the system of linear equations.

11. $x = y + 2$
$-3x + 3y = 6$

12. $3x - 6y = -9$
$-5x + 10y = 10$

13. $-4x + 4y = 32$
$3x + 24 = 3y$

5.5 Solving Equations by Graphing *(pp. 261–266)*

Solve $3x - 1 = -2x + 4$ by graphing. Check your solution.

Step 1 Write a system of linear equations using each side of the original equation.

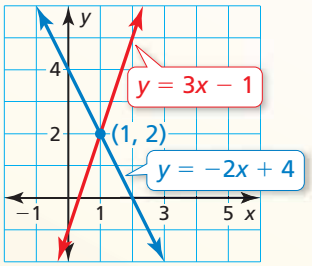
$y = 3x - 1$ → $3x - 1 = -2x + 4$ ← $y = -2x + 4$

Step 2 Graph the system.

$y = 3x - 1$ Equation 1

$y = -2x + 4$ Equation 2

The graphs intersect at (1, 2).



So, the solution of the equation is $x = 1$.

Check

$3x - 1 = -2x + 4$

$3(1) - 1 \stackrel{?}{=} -2(1) + 4$

$2 = 2$ ✓

Solve the equation by graphing. Check your solution(s).

14. $\frac{1}{3}x + 5 = -2x - 2$ **15.** $|x + 1| = |-x - 9|$ **16.** $|2x - 8| = |x + 5|$

5.6 Graphing Linear Inequalities in Two Variables *(pp. 267–272)*

Graph $4x + 2y \geq -6$ in a coordinate plane.

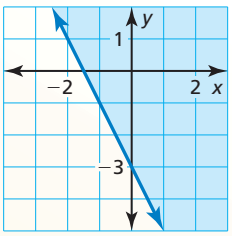
Step 1 Graph $4x + 2y = -6$, or $y = -2x - 3$. Use a solid line because the inequality symbol is ≥.

Step 2 Test (0, 0).

$4x + 2y \geq -6$ Write the inequality.

$4(0) + 2(0) \stackrel{?}{\geq} -6$ Substitute.

$0 \geq -6$ ✓ Simplify.



Step 3 Because (0, 0) is a solution, shade the half-plane that contains (0, 0).

Graph the inequality in a coordinate plane.

17. $y > -4$ **18.** $-9x + 3y \geq 3$ **19.** $5x + 10y < 40$

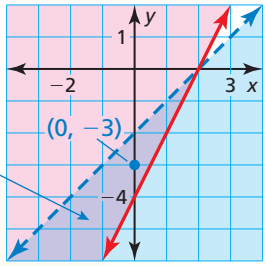
5.7 Systems of Linear Inequalities *(pp. 273–280)*

Graph the system. $y < x - 2$ Inequality 1

$y \geq 2x - 4$ Inequality 2

Step 1 Graph each inequality.

Step 2 Find the intersection of the half-planes. One solution is (0, −3).



Graph the system of linear inequalities.

20. $y \leq x - 3$
$y \geq x + 1$

21. $y > -2x + 3$
$y \geq \frac{1}{4}x - 1$

22. $x + 3y > 6$
$2x + y < 7$

5 Chapter Test

Solve the system of linear equations using any method. Explain why you chose the method.

1. $8x + 3y = -9$
$-8x + y = 29$

2. $\frac{1}{2}x + y = -6$
$y = \frac{3}{5}x + 5$

3. $y = 4x + 4$
$-8x + 2y = 8$

4. $x = y - 11$
$x - 3y = 1$

5. $6x - 4y = 9$
$9x - 6y = 15$

6. $y = 5x - 7$
$-4x + y = -1$

7. Write a system of linear inequalities so the points $(1, 2)$ and $(4, -3)$ are solutions of the system, but the point $(-2, 8)$ is not a solution of the system.

8. How is solving the equation $|2x + 1| = |x - 7|$ by graphing similar to solving the equation $4x + 3 = -2x + 9$ by graphing? How is it different?

Graph the system of linear inequalities.

9. $y > \frac{1}{2}x + 4$
$2y \leq x + 4$

10. $x + y < 1$
$5x + y > 4$

11. $y \geq -\frac{2}{3}x + 1$
$-3x + y > -2$

12. You pay \$45.50 for 10 gallons of gasoline and 2 quarts of oil at a gas station. Your friend pays \$22.75 for 5 gallons of the same gasoline and 1 quart of the same oil.

a. Is there enough information to determine the cost of 1 gallon of gasoline and 1 quart of oil? Explain.

b. The receipt shown is for buying the same gasoline and same oil. Is there now enough information to determine the cost of 1 gallon of gasoline and 1 quart of oil? Explain.

c. Determine the cost of 1 gallon of gasoline and 1 quart of oil.

13. Describe the advantages and disadvantages of solving a system of linear equations by graphing.

14. You have at most \$60 to spend on trophies and medals to give as prizes for a contest.

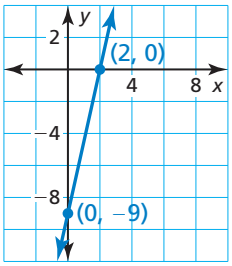
a. Write and graph an inequality that represents the numbers of trophies and medals you can buy. Identify and interpret a solution of the inequality.

b. You want to purchase at least 6 items. Write and graph a system that represents the situation. How many of each item can you buy?

15. Compare the slopes and y-intercepts of the graphs of the equations in the linear system $8x + 4y = 12$ and $3y = -6x - 15$ to determine whether the system has one solution, no solution, or infinitely many solutions. Explain.

5 Cumulative Assessment

1. The graph of which equation is shown?



Ⓐ $9x - 2y = -18$

Ⓑ $-9x - 2y = 18$

Ⓒ $9x + 2y = 18$

Ⓓ $-9x + 2y = -18$

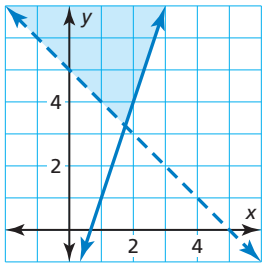
2. A van rental company rents out 6-, 8-, 12-, and 16-passenger vans. The function $C(x) = 100 + 5x$ represents the cost C (in dollars) of renting an x-passenger van for a day. Choose the numbers that are in the range of the function.

130	140	150	160	170	180	190	200

3. Fill in the system of linear inequalities with $<$, $\leq$, $>$, or $\geq$ so that the graph represents the system.

y ☐ $3x - 2$

y ☐ $-x + 5$

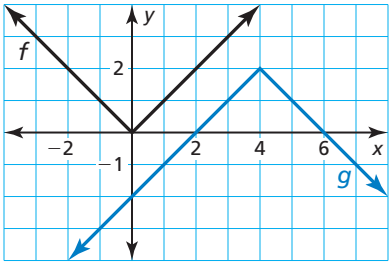


4. Your friend claims to be able to fill in each box with a constant so that when you set each side of the equation equal to y and graph the resulting equations, the lines will intersect exactly once. Do you support your friend's claim? Explain.

$4x +$ ☐ $= 4x +$ ☐

5. Select the phrases you should use when describing the transformations from the graph of f to the graph of g.

reflection in the x-axis	reflection in the y-axis
horizontal translation	vertical translation
horizontal stretch	vertical stretch
horizontal shrink	vertical shrink



6. Which two equations form a system of linear equations that has no solution?

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

7. Fill in a value for a so that each statement is true for the equation $ax - 8 = 4 - x$.

a. When $a =$ ____, the solution is $x = -2$.

b. When $a =$ ____, the solution is $x = 12$.

c. When $a =$ ____, the solution is $x = 3$.

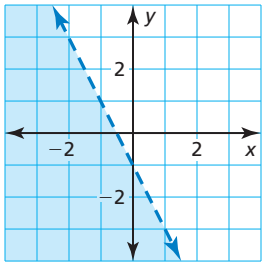
8. Which ordered pair is a solution of the linear inequality whose graph is shown?

Ⓐ $(1, 1)$

Ⓑ $(-1, 1)$

Ⓒ $(-1, -1)$

Ⓓ $(1, -1)$



9. Which of the systems of linear equations are equivalent?

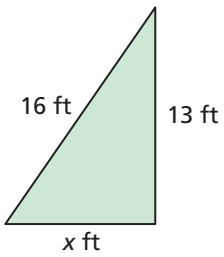
$4x - 5y = 3$
$2x + 15y = -1$

$4x - 5y = 3$
$-4x - 30y = 2$

$4x - 5y = 3$
$4x + 30y = -1$

$12x - 15y = 9$
$2x + 15y = -1$

10. The value of x is more than 9. Which of the inequalities correctly describe the triangle? The perimeter (in feet) is represented by P, and the area (in square feet) is represented by A.



$P < 29$ $A > 117$ $P > 38$ $A > 58.5$ $A > 104$