13-1 NAME ____________ DATE ________ PERIOD ______

Study Guide

Student Edition
Pages 550–553

Graphing Systems of Equations

The ordered pair $(-1, -3)$ is the solution of the system of equations

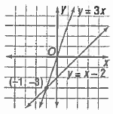
$y = x - 2$
$y = 3x$

because when -1 is substituted for x and -3 is substituted for y, both equations are true.

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

You can also graph both equations to show that $(-1, -3)$ is the solution of the system.

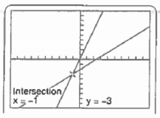
The graphs appear to intersect at $(-1, -3)$. Since $(-1, -3)$ is the solution of each equation, it is the solution of the system of equations.



You can also use a graphing calculator to solve the system of equations.

Step 1 Enter these keystrokes in the Y= screen:
[X, T, θ, n] [−] 2 [ENTER]
3 [X, T, θ, n] [ENTER] [GRAPH]

Step 2 Use the INTERSECT feature to find the intersection point.
[2nd] [CALC] 5 [ENTER] [ENTER] [ENTER]



The solution is $(-1, -3)$.

Solve each system of equations by graphing.

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

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

x	y
−1	2
0	2
1	2

y-int: (0,0)
m = 1↑ / 1→ or 1↓ / 1←
(2,2)

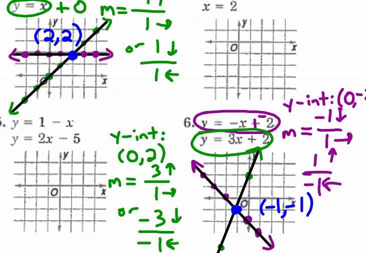
3. $y = -3$
 $x = 2$

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

5. $y = 1 - x$
 $y = 2x - 5$

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

y-int: (0,2)
m = 3↑ / 1→ or −3↓ / −1←
y-int: (0,−2)
m = −1↓ / 1→, 1↑ / −1←
(−1,−1)



solution: (−1,−1)

13-1 NAME ____________ DATE ________ PERIOD ______

Practice

Student Edition
Pages 550–553

Graphing Systems of Equations

Solve each system of equations by graphing.

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

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

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

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

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

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

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

8. $-x + y = 2$
 $-2x + y = 7$

9. $y = x + 6$
 $y = 2$

10. $x - y = 4$
 $y = -2x + 2$

11. $y = x + 2$
 $3x + y = 10$

12. $y = x + 2$
 $2x + y = -1$

13-2

NAME ______________ DATE ________ PERIOD ______

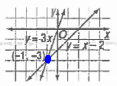
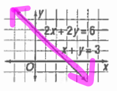
Study Guide

Student Edition
Pages 554–559

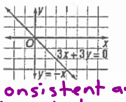
Solutions of Systems of Equations

A system of linear equations is:

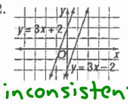
- **inconsistent** if the graphs of the equations are parallel. An inconsistent system has no solution.
- **consistent and independent** if the graphs of the equations intersect at one point. A consistent and independent system has one solution.
- **consistent and dependent** if the equations have the same graph. A consistent and dependent system has infinitely many solutions.

Graph	Description of Graph	Number of Solutions	Type of System
	parallel lines	0	inconsistent
	intersecting lines	1	consistent and independent
	same line	infinitely many	consistent and dependent

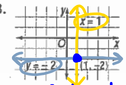
State whether each system is consistent and independent, consistent and dependent, *or* inconsistent.

1. 

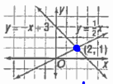
consistent and dependent

2. 

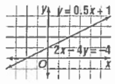
inconsistent

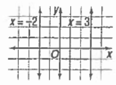
3. 

consistent and independent

4. 

consistent and independent

5. 

6. 

13-2

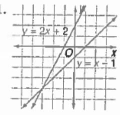
NAME ______________ DATE ________ PERIOD ______

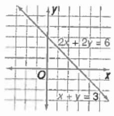
Practice

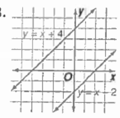
Student Edition
Pages 554–559

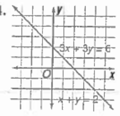
Solutions of Systems of Equations

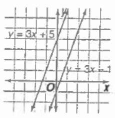
State whether each system is consistent and independent, consistent and dependent, *or* inconsistent.

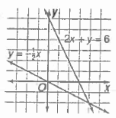
1. 

2. 

3. 

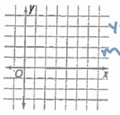
4. 

5. 

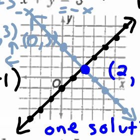
6. 

Determine whether each system of equations has one solution, no solution, *or* infinitely many solutions *by graphing. If the system has one solution, name it.*

7. $2x + y = 4$
$4x + 2y = 8$

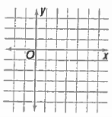


8. $y = x - 1$ y-int: (0,−1) $m = \frac{1}{1}$
$x + y = 3$
$y = -x + 3$
y-int: (0,3)
$m = \frac{-1}{1}$

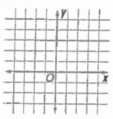


(0,−1)
(2, 1)
one solution

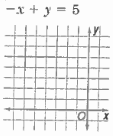
9. $y = x - 2$
$y = x - 5$



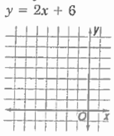
10. $y = 2x$
$y = 2x + 3$



11. $y = x + 5$
$-x + y = 5$



12. $x - y = -5$
$y = 2x + 6$



13–3 NAME ______ DATE ______ PERIOD ______

Study Guide

Student Edition
Pages 560–565

Substitution

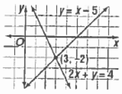
You can use a method called *substitution* to solve a system of linear equations.

Example: Use substitution to solve the system of equations.

$y = x - 5$
$2x + y = 4$

The first equation tells you that y is equal to $x - 5$, so substitute $x - 5$ for y in the second equation. Then solve for x.

$2x + y = 4$
$2x + x - 5 = 4$ *Replace y with x − 5.*
$3x - 5 = 4$
$3x - 5 + 5 = 4 + 5$ *Add 5 to each side.*
$3x = 9$
$\frac{3x}{3} = \frac{9}{3}$ *Divide each side by 3.*
$x = 3$



Now choose one of the original equations. Substitute 3 for x in the equation you have chosen. Then solve for y.

$y = x - 5$ *Choose one of the original equations.*
$y = 3 - 5$ *Substitute 3 for x.*
$y = -2$

The solution of the system of equations is $(3, -2)$.

Use substitution to solve each system of equations.

1. $y = x$
$x + y = 6$
$(y) + y = 6 \Rightarrow 2y = 6$
$\frac{2y}{2} = \frac{6}{2}$
$y = 3$
$y = x$
$3 = x$
$x = 3$
$(3, 3)$

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

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

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

5. $x + y = 0$
$x - y = 4$

6. $y = 2x + 3$
$y - x = 10$

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

8. $y = 3 - 2x$
$4x + y = 5$
see notes

9. $x = y - 10$
$3x = y$

10. $2y = x + 6$
$y = 2x + 3$

11. $3x = y + 5$
$y = 2x - 5$
see notes

12. $y = 4x - 6$
$y = x - 3$

13. $x = 5y - 12$
$x - y = 0$

14. $3y = 2x - 3$
$y = -\frac{1}{3}x + 2$
see notes

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

11) $\begin{cases} 3x = y + 5 \\ y = 2x + {}^{-}5 \end{cases}$

$3x = (2x + {}^{-}5) + 5$

$3x = 2x + \cancel{{}^{-}5} + \cancel{{}^{+}5}$

$+3x = \cancel{2x}$
$+{}^{-}2x = +\cancel{{}^{-}2x}$

$1x = 0$

$x = 0$

$y = 2x + {}^{-}5$

$y = 2(0) + {}^{-}5$

$y = 0 + {}^{-}5$

$y = {}^{-}5$

$(0, {}^{-}5)$

14) $\begin{cases} 3y = 2x - 3 \\ y = -\frac{1}{3}x + 2 \end{cases}$

$\frac{3}{1} \cdot \left(-\frac{1}{3}x + 2\right) = 2x - 3$

$\left(\frac{3}{1}\right)\left(\frac{-1}{3}\right)x + 3(2) = 2x - 3$

$\cancel{-x} + 6 = 2x + {}^{-}3$

$\cancel{+x} \qquad = +x$

$6 = 3x + \cancel{-3}$

$+\,{}^{+}3 = \qquad +\,\cancel{{}^{+}3}$

$9 = 3x$

$\frac{9}{3} = \frac{\cancel{3}x}{\cancel{3}}$

$3 = x$

$x = 3$

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

$y = \frac{-1}{3}\left(\frac{3}{1}\right) + 2$

$y = -1 \quad {}^{+}2$

$y = {}^{+}1$

$(3, 1)$

13-3 NAME ______ DATE ______ PERIOD ______

Practice Student Edition Pages 560–565

Substitution

Use substitution to solve each system of equations.

1. $y = x + 8$ $x + y = 2$	2. $y = 2x$ $5x - y = 9$	3. $y = x + 2$ $3x + 3y = 6$
4. $x = 3y$ $2x + 4y = 10$	5. $x = y + 9$ $x + y = -7$	6. $y = 2x + 1$ $2x - y = 3$
7. $x = 3y$ $2x + 3y = 15$	8. $x - 2y = 4$ $3x = 6y + 12$	9. $x = 5y - 2$ $2x + 2y = 4$
10. $4y + 2x = 24$ $x = 3y + 2$	11. $y = 3x + 8$ $4x + 2y = 6$	12. $x = 3y + 10$ $2x + 2y = -12$
13. $x + 2y = -4$ $-2x - 3y = 9$	14. $5x + 2y = 7$ $4x + y = 8$	15. $x = 2y + 11$ $3x + 2y = 9$
16. $x - 2y = -7$ $5x - 7y = -8$	17. $6x - 4y = -5$ $2x + y = 3$	18. $x + 3y = 10$ $4x - 5y = 6$

 81 *Algebra: Concepts and Applications*

13–4 NAME ________________ DATE ________ PERIOD ________

Study Guide

Student Edition Pages 566–571

Elimination Using Addition and Subtraction

In Lesson 13–3 you used substitution to solve systems of linear equations. You can also use the *elimination method* to solve systems of linear equations. When you use the elimination method, you eliminate one of the variables by adding or subtracting the equations. Add the equations to eliminate the variable whose coefficients are additive inverses. Subtract the equations to eliminate the variable whose coefficients are the same.

Example: Use elimination to solve the system of equations.

$2x - y = -3$
$2x + y = -9$

Step 1 The coefficients of y are -1 and 1, so add the equations to eliminate the y terms. Then solve for x.

$2x - y = -3$
$(+)2x + y = -9$ *Add the equations.*
$4x + 0 = -12$ *The y terms are eliminated.*
$4x = -12$ *Divide each side by 4.*
$x = -3$ *The value of x is −3.*

Step 2 Replace x in one of the original equations with -3. Then solve for y.

$2x + y = -9$ *Choose an equation.*
$2(-3) + y = -9$ *Replace x with −3.*
$-6 + y = -9$
$-6 + y + 6 = -9 + 6$ *Add 6 to each side.*
$y = -3$ *The value of y is −3.*

The solution of the system of equations is $(-3, -3)$.

You could also use subtraction to eliminate the x terms in the example.

Step 1 The coefficients of x are both 2, so subtract to eliminate the x terms.

$2x - y = -3$
$(-)2x + y = -9$ *Subtract the equations.*
$0 - 2y = 6$ *The x terms are eliminated.*
$-2y = 6$
$y = -3$

Step 2 Solve for x.

$2x + y = -9$
$2x + (-3) = -9$ *Replace y with −3.*
$2x = -6$
$x = -3$

The solution is $(-3, -3)$.

Use elimination to solve the system of equations.

1. $x - y = 2$
 $+\ x + y = 0$
 $2x = 2$; $\frac{2x}{2} = \frac{2}{2}$
 $x = 1$
 $y = -1$
 $(1, -1)$

2. $3x + 2y = 6$
 $+\ -3x + 1y = 0$
 $3y = 6$; $\frac{3y}{3} = \frac{6}{3}$
 $y = 2$
 $x = \frac{2}{3}$
 $(\frac{2}{3}, 2)$

3. (+1) $2x + 4y = 4$
 $+\ -3x - 4y = 6$
 $-5x = +10$; $\frac{-5x}{-5} = \frac{+10}{-5}$
 $x = -2$
 $y = 0$
 $(-2, 0)$

4. $2x + y = 6$
 $3x + y = 5$

5. $3x + 4y = 11$
 $3x + 5y = -7$

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

13–4 NAME ________________ DATE ________ PERIOD ________

Practice

Student Edition Pages 566–571

Elimination Using Addition and Subtraction

Use elimination to solve each system of equations.

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

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

3. $3x + y = 12$
 $x + y = 8$

4. $x + 5y = -12$
 $x + 2y = -9$

5. $x + 2y = 9$
 $3x - 2y = 3$

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

7. $4x - 3y = 10$
 $2x - 3y = 2$

8. $2x + 5y = 1$
 $2x + 10y = 10$

9. $3y = x + 4$
 $2x + 3y = 19$

10. $2x = y - 4$
 $2x + 6y = 3$

11. $4y = 2x + 8$
 $5x - 4y = 22$

12. $2x + y = 6$
 $2x - 2y = -12$

13. $-3x - y = 24$
 $3x - 2y = 3$

14. $2x + 3y = 8$
 $y = 2x + 8$

15. $-7x = y - 4$
 $5x - y = 8$

16. $3x + 5y = 7$
 $4x + 5y = 1$

17. $6x - 3y = 3$
 $6x - 5y = -3$

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

see notes

© Glencoe/McGraw-Hill 82 Algebra: Concepts and Applications

18) $y = 2x + 4$

$+-2x \quad = +-2x$

$2x - 4y = 8$

$$\begin{cases} \cancel{-2x} + y = +4 \\ + \ \cancel{2x} - 4y = +8 \end{cases}$$

$\cancel{-3}y = +12$

$\frac{}{\cancel{-3}} \quad \frac{}{-3}$

$y = -4$

$2x - 4y = 8$

$2x + 4(-4) = 8$

$2x + \cancel{+16} = +8$

$+\cancel{-16} = +-16$

$\cancel{2}x = -8$

$\frac{}{\cancel{2}} \quad \frac{}{2}$

$x = -4$

$(-4, -4)$

13-5 NAME ______________________ DATE ________ PERIOD ______

Study Guide

Student Edition
Pages 572–577

Elimination Using Multiplication

In some systems of equations, adding or subtracting the equations will not eliminate one of the variables. When this is true, you can eliminate by first multiplying one or both of the equations by a number, and then adding or subtracting the equations.

Example: Use elimination to solve the system of equations.

$2x + y = 6$
$3x + 3y = 9$

Adding or subtracting the equations will not eliminate the x terms or the y terms. If you multiply the first equation by -3, however, the y terms will be additive inverses. Then you can add the equations to eliminate the y terms.

$$\begin{array}{l} 2x + y = 6 \\ \underline{3x + 3y = 9} \end{array} \quad \boxed{\text{Multiply by } -3.} \quad \begin{array}{l} -3(2x + y = 6) \\ \underline{\ \ 3x + 3y = 9} \end{array} \rightarrow \begin{array}{r} -6x - 3y = -18 \\ \underline{(+)\ 3x + 3y = 9} \\ -3x + 0 = -9 \\ -3x = -9 \\ x = 3 \end{array}$$

Now find the value of y.

$2x + y = 6$	*Choose either of the original equations.*
$2(3) + y = 6$	*Replace x with 3.*
$6 + y = 6$	*Simplify. Then subtract 6 from each side.*
$y = 0$	

Check: $2x + y = 6$; $2(3) + 0 \stackrel{?}{=} 6$; $6 = 6$ ✓ $\qquad 3x + 3y = 9$; $3(3) + 3(0) \stackrel{?}{=} 9$; $9 = 9$ ✓

The solution of this system of equations is (3, 0).

Use elimination to solve each system of equations.

1. $x + 2y = 1$
   $3x + y = 8$
   see notes
2. $x + 11y = -6$
   $2x + y = 9$
   see notes
3. $8x - 3y = -32$
   $x - y = 1$
4. $3x - 5y = 8$
   $x + 2y = -1$
5. $3x - 4y = 5$
   $x + 7y = 10$
6. $2x - y = 2$
   $3x - 2y = 3$
7. $3x + 5y = 9$
   $9x + 2y = -12$
8. $8x + 9y = -45$
   $x + 6y = 9$
   see notes
9. $12x - 10y = 30$
   $2x + 5y = 15$
   see notes

1) $(-2)\begin{cases} x + 2y = 1 \\ 3x + 1y = 8 \end{cases}$

$$\begin{cases} \cancel{x} + \cancel{2y} = 1 \\ + \; -6x + \cancel{-2y} = -16 \end{cases}$$

$$\frac{\cancel{-5}x}{\cancel{-5}} = \frac{-15}{-5}$$

$$x = 3$$

$x + 2y = 1$

$\cancel{(3)} + 2y = 1$

$\cancel{+-3} \quad = +-3$

$\frac{\cancel{2}y}{\cancel{2}} = \frac{-2}{2}$

$y = -1$

$(3, -1)$

2) $(-2)\begin{cases} x + 11y = -6 \\ 2x + y = 9 \end{cases}$

$$\begin{cases} \cancel{-2x} + -22y = {}^{+}12 \\ + \; \cancel{2x} + y = 9 \end{cases}$$

$$\frac{\cancel{-21}y}{\cancel{-21}} = \frac{21}{-21}$$

$$y = -1$$

$x + 11y = -6$

$x + 11(-1) = -6$

$x + \cancel{-11} = -6$

$+ \cancel{+11} = ++11$

$x = {}^{+}5$

$(5, -1)$

8) $\begin{cases} 8x + 9y = -45 \\ x + 6y = 9 \end{cases}$ (-8)

$\begin{cases} \cancel{8x} + 9y = -45 \\ +\ \cancel{-8x} + -48y = -72 \end{cases}$

$\frac{\cancel{-39}y}{\cancel{-39}} = \frac{-117}{-39}$

$39 \times 3 = 117$

$y = +3$

$x + 6y = 9$

$x + 6(3) = 9$

$x + \cancel{18} = 9$

$+\cancel{-18} = +-18$

$x = -9$

$(-9, 3)$

9) $\begin{cases} 12x - 10y = 30 \\ 2x + 5y = 15 \end{cases}$ $(+2)$

$\begin{cases} 12x \cancel{-10y} = 30 \\ +\ 4x \cancel{+10y} = 30 \end{cases}$

$\frac{\cancel{16}x}{\cancel{16}} = \frac{60}{16}$

$x = 3\frac{12 \div 2}{16 \div 2} = 3\frac{6 \div 2}{8 \div 2} = 3\frac{3}{4}$

$2x + 5y = 15$

$2(3\frac{3}{4}) + 5y = 15$

$(\frac{\overset{1}{\cancel{2}}}{1})(\frac{15}{\underset{2}{\cancel{4}}}) + 5y = 15$

$\cancel{\frac{15}{2}} + 5y = \frac{15}{1}$

$+\cancel{-\frac{15}{2}} = +-\frac{15}{2}$

$5y = \frac{15 \times 2}{1 \times 2} + \frac{-15}{2}$

$5y = \frac{30}{2} + \frac{-15}{2}$

$\frac{1}{5} \cdot \cancel{5}y = \frac{\overset{3}{\cancel{15}} \div 5}{2} \cdot \frac{1}{\cancel{5} \div 5}$

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

$(3\frac{3}{4}, 1\frac{1}{2})$

13-5

NAME ______ DATE ______ PERIOD ______

Practice

Student Edition Pages 572–577

Elimination Using Multiplication

Use elimination to solve each system of equations.

1. $x + 3y = 6$, $2x - 7y = -1$
2. $9x + 3y = 12$, $2x + y = 5$
3. $3x - y = 14$, $5x + 4y = 12$
4. $3x - 3y = -3$, $2x - y = -5$
5. $3x + y = 2$, $6x + 2y = 4$ see notes
6. $5x - y = 16$, $-4x - 3y = 10$
7. $5x + 2y = 24$, $10x - 5y = -15$
8. $3x + 4y = 6$, $7x + 8y = 10$ see notes
9. $2x - 3y = 5$, $3x + 9y = 21$
10. $3x + 2y = 11$, $6x + 3y = 13$
11. $6x - 2y = 4$, $2x - 5y = -3$
12. $-7x - 3y = -5$, $5x + 6y = 19$
13. $5x - 10y = -3$, $-3x - 5y = 15$
14. $2x + 3y = 2$, $6x + 6y = 5$
15. $2x + 4y = 6$, $3x + 6y = 12$
16. $3x + 3y = 9$, $5x + 4y = 10$
17. $2x - 7y = 5$, $3x - 6y = 12$ see notes
18. $2x - 4y = 18$, $-5x - 6y = 3$

 83 *Algebra: Concepts and Applications*

5) $(-2)\begin{cases} 3x + y = 2 \\ 6x + 2y = 4 \end{cases}$

$$\begin{cases} -6x + -2y = -4 \\ +6x + 2y = +4 \end{cases}$$

$$0x + 0y = 0$$

$0 = 0$ True

All real numbers (same line)

No solution

$\emptyset$ or

ex) $7 \neq 3$

All real numbers

$x \in \mathbb{R}$

$7 = 7$

8) $(-2)\begin{cases} 3x + 4y = 6 \\ 7x + 8y = 10 \end{cases}$

$$+\begin{cases} -6x + \cancel{^-8y} = -12 \\ 7x + \cancel{8y} = 10 \end{cases}$$

$$^+1x = -2$$

$$x = -2$$

$$3x + 4y = 6$$

$$3(-2) + 4y = 6$$

$$\cancel{-6} + 4y = 6$$

$$\cancel{+6} \qquad = +6$$

$$\frac{\cancel{4}y}{\cancel{4}} = \frac{12}{4}$$

$$y = 3$$

$(-2, 3)$

17) $\begin{matrix} (3) \\ -(2) \end{matrix}\begin{cases} 2x \overset{-}{+} 7y = 5 \\ 3x \overset{-}{+} 6y = 12 \end{cases}$

$$+\begin{cases} \cancel{6x} \overset{-}{+} 21y = ^+15 \\ \cancel{-6x} + ^+12y = ^-24 \end{cases}$$

$$\frac{\cancel{-9}y}{\cancel{-9}} = \frac{-9}{-9}$$

$$\boxed{y = ^+1}$$

$$2x - 7y = 5$$

$$2x - 7(1) = 5$$

$$2x \cancel{\overset{-}{+}7} = 5$$

$$\cancel{+7} = +7$$

$$\frac{\cancel{2}x}{\cancel{2}} = \frac{12}{2}$$

$$\boxed{x = 6}$$

$(6, 1)$

13-6 NAME ______ DATE ______ PERIOD ______

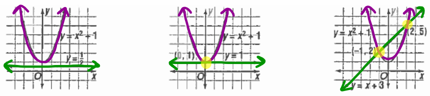
Study Guide

Student Edition Pages 580–585

Solving Quadratic-Linear Systems of Equations

A system of equations that contains both a quadratic equation and a linear equation is called a **quadratic-linear** system of equations.

One way to solve quadratic-linear systems is to graph them and identify any ordered pairs that satisfy both equations. Another way is to use the substitution method.



The graphs do not intersect, so the system has no solution. The graphs intersect at one point, so the system has one solution. The graphs intersect at two points, so the system has two solutions.

Example: Use substitution to solve the system of equations.

$y = -2$
$y = x^2 - 11$

Since $y = -2$, substitute -2 for y in the second equation. Then solve for x.

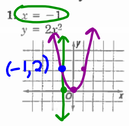
$y = x^2 - 11$	
$-2 = x^2 - 11$	*Replace y with −2.*
$9 = x^2$	*Add 11 to each side.*
$3 = x$ or $-3 = x$	*Take the square root of each side.*

The solutions of the system of equations are $(-3, -2)$ and $(3, -2)$. Graphing the equations will show that they intersect at $(-3, -2)$ and $(3, -2)$.

Solve each system of equations by graphing.

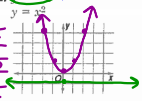
1. $y = -1$
$y = 2x^2$

x	y
-2	8
-1	2
0	0
1	2
2	8

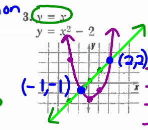


2. $y = -1$ No solution
$y = x^2$

x	y
-2	4
-1	1
0	0
1	1
2	4



3. $y = x$
$y = x^2 - 2$



x	y
-2	2
-1	-1
0	-2
1	-1
2	2

Use substitution to solve each system of equations.

4. $y = 4$
$y = x^2$

$\sqrt{(4)} = \sqrt{x^2}$

$\pm 2 = x$

$x = +2$ or -2

$(+2, 4)$ and $(-2, 4)$

5. $x = -1$
$y = x^2$

$y = (-1)^2$

$y = 1$

$(-1, 1)$

6. $y = 5$
$y = x^2 - 4$

13-6 NAME ______ DATE ______ PERIOD ______

Practice

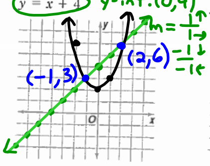
Student Edition Pages 580–585

Solving Quadratic-Linear Systems of Equations

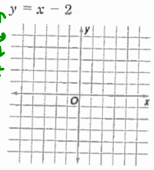
Solve each system of equations by graphing.

1. $y = x^2 + 2$
$y = x + 4$

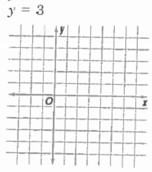
x	y
-2	6
-1	3
0	2
1	3
2	6



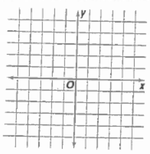
2. $y = x^2 - 1$
$y = x - 2$



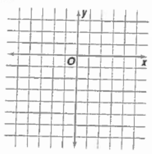
3. $y = -x^2 + 3$
$y = 3$



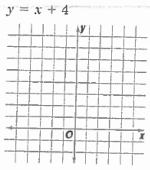
4. $y = x^2 + 1$
$y = -x - 1$



5. $y = -x^2$
$y = -2x + 1$



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



Use substitution to solve each system of equations.

7. $y = -x^2 + 1$
$y = x - 1$
see notes

8. $y = x^2 + 2$
$y = -4$
see notes

9. $y = x^2 - 5$
$x = -3$

10. $y = -6x^2 + 1$
$y = x + 1$

11. $y = 2x^2 + 3$
$y = x + 2$

12. $y = x^2 + x - 4$
$y = x - 3$

7) $\begin{cases} y = -x^2 + 1 \\ y = x - 1 \end{cases} \longrightarrow (x-1) = \cancel{-x^2} + \cancel{1}$

$+x^2 + -1 = \cancel{+x^2} + \cancel{-1}$

$x^2 + -1 + x + -1 = 0$

$x^2 + x + -2 = 0$

$(x+2)\cdot(x-1) = 0$

$x + \cancel{2} = 0$ or $x \cancel{-1} = 0$

$+\cancel{-2} = +-2$ $\quad$ $\cancel{+1} = +1$

$x = -2$ or $x = 1$

$(-2, -3)$ $\quad$ $(1, 0)$

$y = x - 1$ $\quad$ $y = x - 1$

$y = (-2) + -1$ $\quad$ $y = (1) - 1$

$y = -3$ $\quad$ $y = 0$

8) $\begin{cases} y = x^2 + 2 \\ y = -4 \end{cases} \longrightarrow (-4) = x^2 + \cancel{2}$

$+-2 = \quad +\cancel{-2}$

$\sqrt{-6} = \sqrt{x^2}$

no solution $= x$

$\varnothing$

13-7 NAME ______ DATE ______ PERIOD ______

Study Guide

Student Edition Pages 586–591

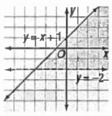
Graphing Systems of Inequalities

To graph a system of linear inequalities, first graph a boundary line for each inequality. Then shade on one side of each boundary line. The region where the shaded areas overlap contains the solutions of the system of inequalities.

Example: Solve the system of inequalities by graphing.
$y > -2$
$y \le x + 1$

Step 1 Graph the boundary lines $y = -2$ and $y = x + 1$. Since y is *greater than* -2, make the line $y = -2$ dashed. The line $y = x + 1$ is solid because y is *less than or equal to* $x + 1$.

Step 2 Because $y > -2$ has a *greater than* symbol, shade above the boundary line. Shade below the boundary line for $y \le x + 1$ because this inequality contains a *less than* symbol.



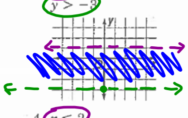
The region where the shaded areas intersect is the solution of the system of inequalities.

Use the following rules to help you graph inequalities.

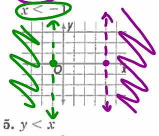
Inequality	Example	Boundary Line	Where to Shade
$y < ax + b$	$y < 2x$	dashed	below the line
$y \le ax + b$	$y \le -x + 1$	solid	below the line
$y > ax + b$	$y > 5x - 2$	dashed	above the line
$y \ge ax + b$	$y \ge -4x$	solid	above the line

***Solve each system of inequalities by graphing. If the system does not have a solution, write* no solution.**

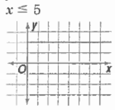
1. $y < 1$
$y > -3$



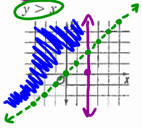
2. $x > 4$
$x < -1$
no solution



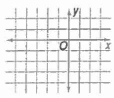
3. $y \ge -2$
$x \le 5$



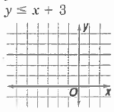
4. $x \le 2$
$y > x$



5. $y < x$
$x \le -1$



6. $y \ge 0$
$y \le x + 3$



13-7 NAME ______ DATE ______ PERIOD ______

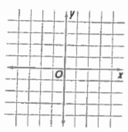
Practice

Student Edition Pages 586–591

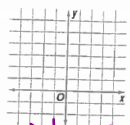
Graphing Systems of Inequalities

***Solve each system of inequalities by graphing. If the system does not have a solution, write* no solution.**

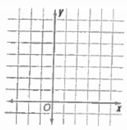
1. $x \le 2$
$y \ge -1$



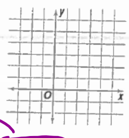
2. $x > 2$
$y > x + 1$



3. $x \ge 3$
$y > x + 2$



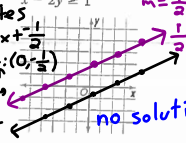
4. $x + y < 1$
$y > x + 3$



5. $2y \ge x + 4$
$x - 2y \ge 1$

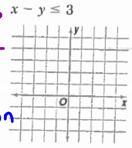
$y \ge \frac{1}{2}x + 2$
y-int (0,2)
$m = \frac{1}{2}$ →
$\frac{1\uparrow}{2\rightarrow}$ $\frac{1\downarrow}{2\leftarrow}$

see notes
$y \le \frac{1}{2}x + \frac{1}{2}$
y-int: $(0, \frac{1}{2})$
$m = \frac{1\uparrow}{2\rightarrow}$
$\frac{-1\downarrow}{-2\leftarrow}$



no solution

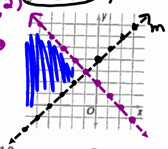
6. $y \le x + 4$
$x - y \le 3$



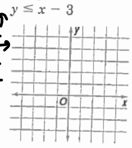
7. $x + y < 2$
$y > x + 4$

$y < -x + 2$
y-int: (0,2)
$m = \frac{-1\downarrow}{1\rightarrow}$
$\frac{1\uparrow}{-1\leftarrow}$

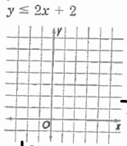
y-int: (0,4)
$m = \frac{1\uparrow}{1\rightarrow}$
$\frac{-1\downarrow}{-1\leftarrow}$



8. $x - y < -4$
$y \le x - 3$

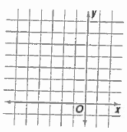


9. $y \ge x + 2$
$y \le 2x + 2$

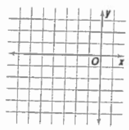


$\frac{-1\downarrow}{2\rightarrow}$

10. $x - y < -5$
$y < -x + 1$

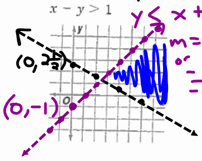


11. $y < x + 2$
$x + y \ge -4$



12. $x + 2y > 5$
$x - y > 1$

see notes
$y > -\frac{1}{2}x + 2\frac{1}{2}$
$y < x + -1$
$m = \frac{1\uparrow}{1\rightarrow}$
$\frac{-1\downarrow}{-1\leftarrow}$
$(0, 2\frac{1}{2})$
$(0, -1)$



5) $\cancel{x} + {}^{-}2y \geq 1$

$+\cancel{{}^{-}x} \quad = +{}^{-}x$

$\dfrac{\cancel{-2}y}{\cancel{-2}} \geq \dfrac{-1x}{-2} + \dfrac{1}{-2}$

$$\boxed{y \leq \frac{1}{2}x + \frac{-1}{2}}$$

12) $\cancel{x} + 2y > 5$

$+\cancel{-x} \quad = +-x$

$\dfrac{\cancel{2}y}{\cancel{2}} > \dfrac{-1x}{2} + \dfrac{5}{2}$

$$\boxed{y > \frac{-1}{2}x + 2\frac{1}{2}}$$

$\cancel{x} - y > 1$

$+\cancel{-x} \quad = +-x$

$\dfrac{-y}{-1} > \dfrac{-x}{-1} + \dfrac{1}{-1}$

$$\boxed{y < x + -1}$$