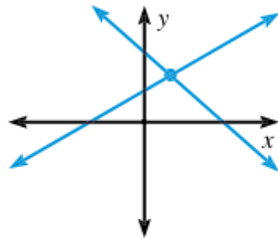


# Algebra 1 Chapter 7 Review

## Solving Linear Systems by Graphing

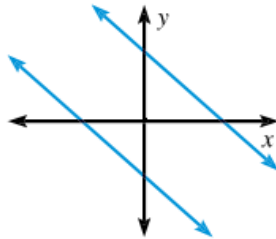
The graph of a system of two linear equations tells you how many solutions the system has.

### One solution



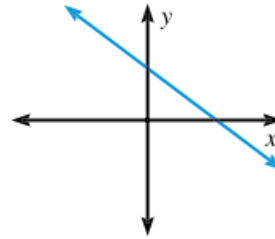
The lines intersect.

### No solution



The lines are parallel.

### Infinitely many solutions



The lines coincide.

## Solving Linear Systems Using Algebra

You can use any of the following algebraic methods to solve a system of linear equations. Sometimes it is easier to use one method instead of another.

Method	Procedure	When to use
Substitution	Solve one equation for $x$ or $y$ . Substitute the expression for $x$ or $y$ into the other equation.	When one equation is already solved for $x$ or $y$
Addition	Add the equations to eliminate $x$ or $y$ .	When the coefficients of one variable are opposites
Subtraction	Subtract the equations to eliminate $x$ or $y$ .	When the coefficients of one variable are the same
Multiplication	Multiply one or both equations by a constant so that adding or subtracting the equations will eliminate $x$ or $y$ .	When no corresponding coefficients are the same or opposites

**7.1 Solve Linear Systems by Graphing**

pp. 427–433

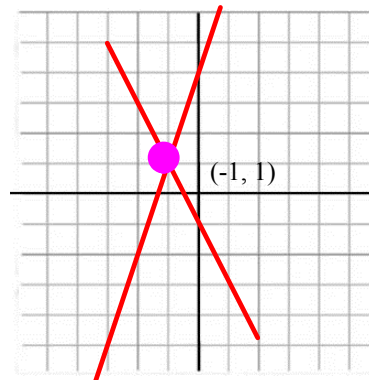
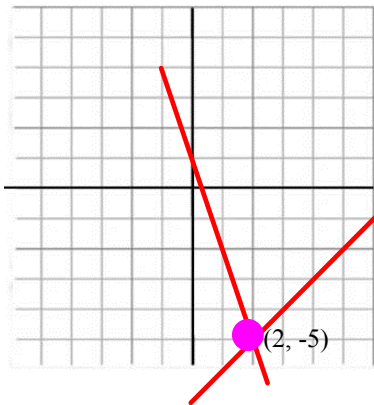
Solve the linear system by graphing. Check your solution.

$$y = -3x + 1$$

$$y = x - 7$$

$$y = 3x + 4$$

$$y = -2x - 1$$

**7.2 Solve Linear Systems by Substitution**

pp. 435–441

Solve the linear system using substitution.

$$y = 2x - 7$$

$$x + 2y = 1$$

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

$$x + 4x - 14 = 1$$

$$5x - 14 = 1$$

$$5x = 15$$

$$x = 3$$

$$y = 2(3) - 7$$

$$y = 6 - 7$$

$$y = -1$$

$$(3, -1)$$

$$x + 4y = 9$$

$$x - y = 4$$

$$x = y + 4$$

$$(y + 4) + 4y = 9$$

$$y + 4 + 4y = 9$$

$$5y + 4 = 9$$

$$5y = 5$$

$$y = 1$$

$$x - (1) = 4$$

$$x - 1 = 4$$

$$x = 5$$

$$(5, 1)$$

## 7.3 Solve Linear Systems by Adding or Subtracting

pp. 444–450

$$\begin{array}{r} x + 2y = 13 \\ -x - 2y = -7 \\ \hline 4y = 20 \\ y = 5 \\ x - 2(5) = -7 \\ x - 10 = -7 \\ x = 3 \end{array}$$

(3, 5)

$$\begin{array}{r} 3x = y + 1 \\ 2x - y = 9 \\ \hline 3x - y = 1 \\ -2x - y = 9 \\ \hline x = -8 \\ 3(-8) - y = 1 \\ -24 - y = 1 \\ -y = 25 \\ y = -25 \end{array}$$

(-8, -25)

$$\begin{array}{r} x + 7y = 12 \\ -2x + 7y = 18 \\ \hline 3x = -6 \\ x = -2 \\ -2 + 7y = 12 \\ 7y = 14 \\ y = 2 \end{array}$$

(-2, 2)

$$\begin{array}{r} 4y = 11 - 3x \\ 3x + 2y = -5 \\ \hline 3x + 4y = 11 \\ -3x + 2y = -5 \\ \hline 2y = 16 \\ y = 8 \\ 3x + 4(8) = 11 \\ 3x + 32 = 11 \\ 3x = -21 \\ x = -7 \end{array}$$

(-7, 8)

## 7.4 Solve Linear Systems by Multiplying First

$$\begin{array}{r} -x + y = -4 \quad (\times 2) \\ 2x - 3y = 5 \\ -2x + 2y = -8 \\ \hline -y = -3 \\ y = 3 \\ -x + 3 = -4 \\ -x = -7 \\ x = 7 \end{array}$$

(3, 7)

$$\begin{array}{r} 5x = 3y - 2 \\ 3x + 2y = 14 \end{array} \rightarrow \begin{array}{r} 5x - 3y = -2 \\ 3x + 2y = 14 \end{array} \xrightarrow[\times 3]{\times 2} \begin{array}{r} 10x - 6y = -4 \\ +9x + 6y = 42 \\ \hline 19x = 38 \\ x = 2 \\ 10(2) - 6y = -4 \\ 20 - 6y = -4 \\ -6y = -24 \\ y = 4 \end{array}$$

(2, 4)

**CAR MAINTENANCE** You pay \$24.50 for 10 gallons of gasoline and 1 quart of oil at a gas station. Your friend pays \$22 for 8 gallons of the same gasoline and 2 quarts of the same oil. Find the cost of 1 quart of oil.

$$\begin{array}{l} 10g + q = 24.50 \\ 8g + 2q = 22.00 \end{array}$$

Gas = 2.25 per gallon  
Oil = 2.00 per quart

## 7.5 Solve Special Types of Linear Systems

Tell whether the linear system has *one solution*, *no solution*, or *infinitely many solutions*.

$$\begin{aligned} \textcircled{1} & x = 2y - 3 \\ \textcircled{2} & 1.5x - 3y = 0 \end{aligned}$$

$$\begin{aligned} \textcircled{1} & -2y + x = -3 \\ & -2y = -x - 3 \\ & y = \frac{1}{2}x + \frac{3}{2} \\ & m = \frac{1}{2} \quad b = \frac{3}{2} \end{aligned}$$

$$\begin{aligned} \textcircled{2} & -3y = -1.5x \\ & y = \frac{1}{2}x \\ & m = \frac{1}{2} \quad b = 0 \\ & \text{(parallel no solution)} \end{aligned}$$

$$\begin{aligned} \textcircled{1} & -x + y = 8 \\ \textcircled{2} & x + 8 = y \end{aligned}$$

$$\textcircled{1} \quad y = x + 8 \\ m = 1 \quad b = 8$$

$$\begin{aligned} \textcircled{2} & y = x + 8 \\ & m = 1 \quad b = 8 \\ & \text{Same slope} \\ & \text{Same y-intercept} \\ & \text{(infinitely many)} \\ & \text{Solution} \end{aligned}$$

$$\begin{aligned} \textcircled{1} & 4x = 2y + 6 \\ \textcircled{2} & 4x + 2y = 10 \end{aligned}$$

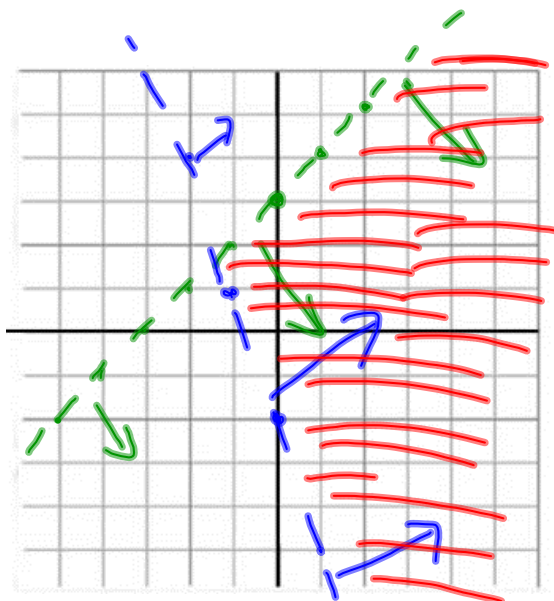
$$\textcircled{1} \quad 2y = 4x - 6 \\ y = 2x - 3$$

$$m = 2 \quad b = -3$$

$$\begin{aligned} \textcircled{2} & 2y = -4x + 10 \\ & y = -2x + 5 \\ & m = -2 \quad b = 5 \\ & \text{different slopes} \\ & \text{(One solution)} \end{aligned}$$

## 7.6 Solve Systems of Linear Inequalities

$$\begin{aligned} y &< x + 3 \\ y &> -3x - 2 \end{aligned}$$



$$\begin{aligned} y &\leq -x - 2 \\ y &> 4x + 1 \end{aligned}$$

