

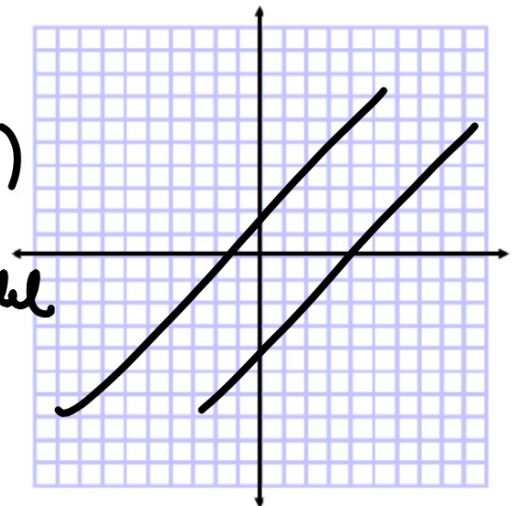
Algebra 2 3.1

Solve systems of linear equations graphically*

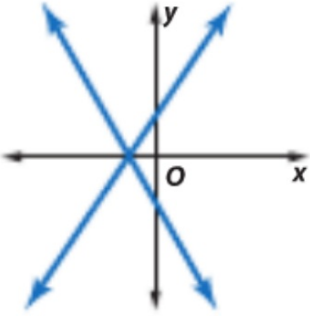
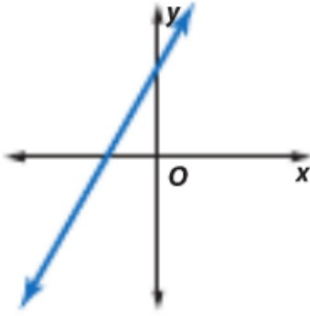
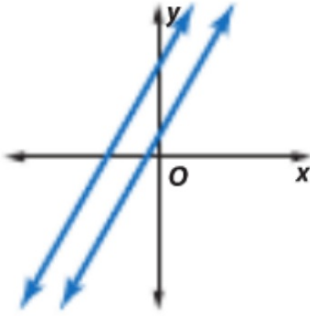
Solve systems of linear equations using tables :(

Solve systems of linear equations algebraically*

system 2 (or more) =
consistent solution(s) exist,
independent exactly one (x, y)
dependent inf many
inconsistent no solutions parallel
substitution method (cut & paste)
elimination method (make zero pairs)
whiteboards



VOCAB: make sure you know it!

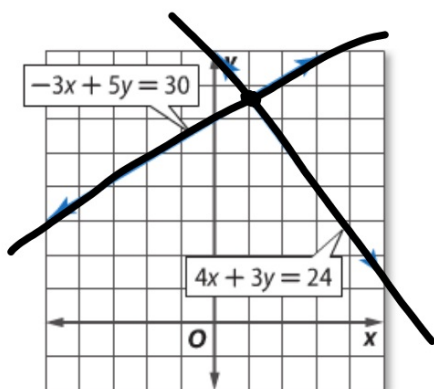
ConceptSummary Characteristics of Linear Systems		
Consistent and Independent	Consistent and Dependent	Inconsistent
 intersecting lines; one solution	 same line; infinitely many solutions	 parallel lines; no solution

Example 3 Classify Systems

Graph each system of equations and describe them as *consistent and independent*, *consistent and dependent*, or *inconsistent*.

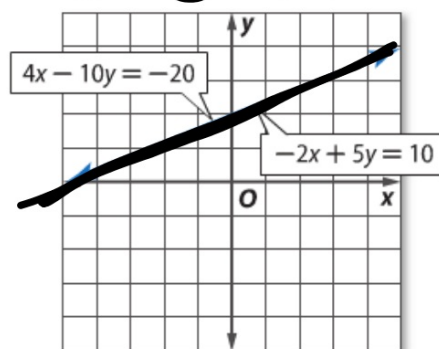
C & Ind.

a. $4x + 3y = 24$
 $-3x + 5y = 30$ $(2, 7.5)$

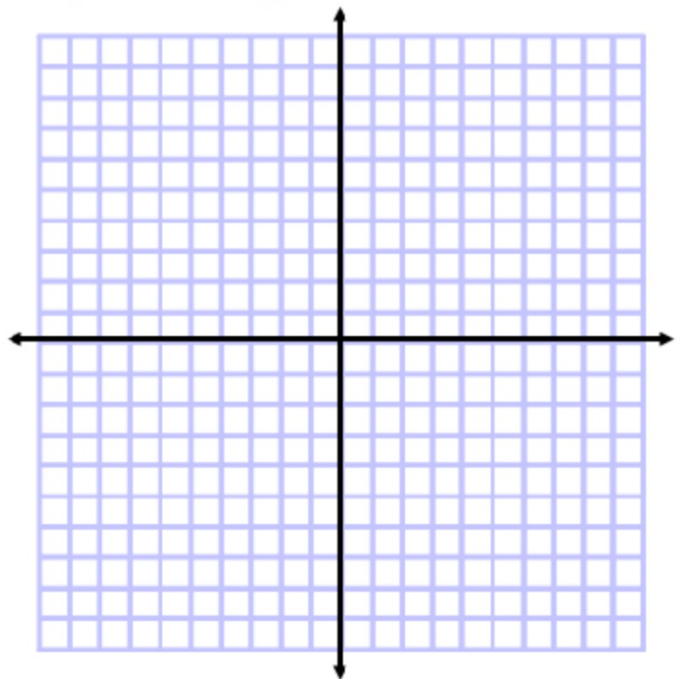
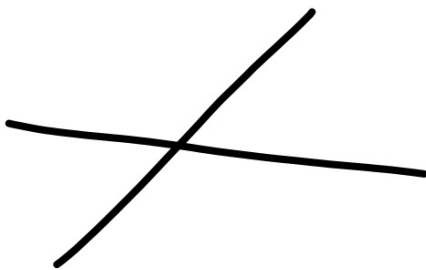


b. $-2x + 5y = 10$
 $4x - 10y = -20$

C & D inf. many



Where do the lines intersect? (IF they do...) Might be off the graph...
Estimate answers (ordered pairs) if necessary.
Be as precise as possible.



Example 2 Solve by Graphing

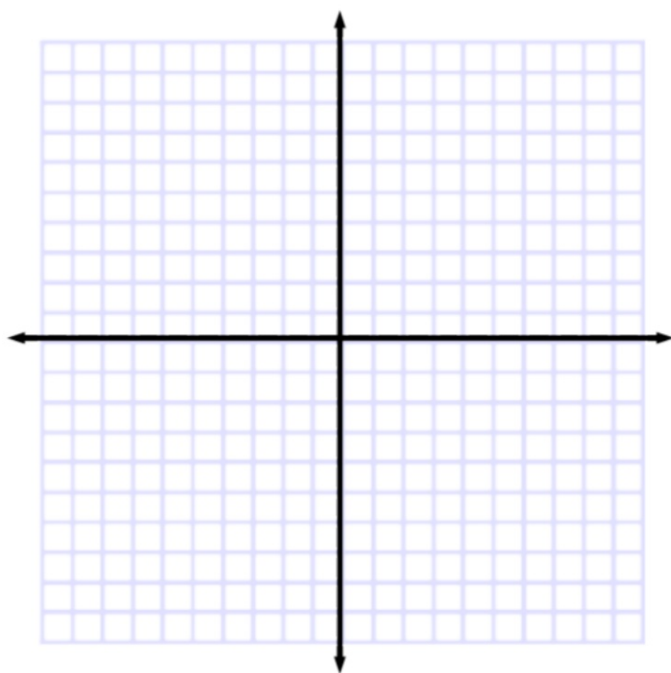
Solve the system of equations by graphing.

$$2x - y = -1$$

$$2y + 5x = -16$$

Guided Practice

3A. $6x - 4y = 15$
 $-6x + 4y = 18$



Cut & Paste: review from Alg.1 Ch. 7

KeyConcept Substitution Method

- Step 1** Solve one equation for one of the variables.
- Step 2** Substitute the resulting expression into the other equation to replace the variable. Then solve the equation.
- Step 3** Substitute to solve for the other variable.

You are the coach
The players can play either position...

cut & paste

Guided Practice

Use substitution to solve each system of equations.

4A. $\begin{cases} 5x - 3y = 23 \\ 2x + y = 7 \end{cases}$

$$\begin{aligned} & -2x \quad -2x \\ & y = 7 - 2x \\ & 5x - 3(7 - 2x) = 23 \\ & \quad (7 - 2x) \end{aligned}$$

$$\begin{aligned} 5x - 3(7 - 2x) &= 23 \\ 5x - 21 + 6x &= 23 \\ 11x &= 44 \\ \frac{11x}{11} &= \frac{44}{11} \quad x = 4 \end{aligned}$$

4B. $\begin{cases} x - 7y = 11 \\ 5x + 4y = -23 \end{cases}$

$$\begin{aligned} x &= 11 + 7y \\ y &= \quad \quad \quad x = 11 + 7(-2) \\ & \quad \quad \quad = 11 - 14 \\ & \quad \quad \quad = -3 \\ & \quad \quad \quad (-3, -2) \\ & \quad \quad \quad -15 + -8 = -23 \\ & \quad \quad \quad 5x + 4y = -23 \\ & \quad \quad \quad 5(11 + 7y) + 4y = -23 \\ & \quad \quad \quad 55 + 35y + 4y = -23 \\ & \quad \quad \quad -55 \quad -55 \\ & \quad \quad \quad 39y = -78 \\ & \quad \quad \quad \frac{39y}{39} = \frac{-78}{39} \quad y = -2 \\ & \quad \quad \quad (4, -1) \end{aligned}$$

Review from Alg 1 Ch. 7
Elimination: form zero pairs

Use elimination to solve the system of equations.

$$\begin{array}{rcl} 5x + 6y = -8 & \xrightarrow{\quad} & 5x + 6y = -8 \\ (2x + 3y = -5) & \xrightarrow{-2} & -4x - 6y = 10 \end{array}$$

$$\begin{array}{r} 10 + 6y = -8 \\ -10 \quad \quad -10 \end{array}$$

$$6y = -18 \quad y = -3$$

$$x = 2$$

$$(2, -3)$$

$$4 + -9 = -5$$

!!

elimination: form zero pairs

$$\begin{array}{l} \text{1A. } 6x - 2y = 10 \\ 3x - 7y = -19 \end{array} \xrightarrow{-2}$$

$$\begin{array}{r} 6x - 2y = 10 \\ -6x + 14y = -38 \\ \hline \end{array} \quad (3, 4)$$

$$\begin{array}{r} 6x - 8 = 10 \\ +8 \quad +8 \\ \hline 6x = 18 \\ \frac{6}{6} \quad \frac{18}{6} \quad x = 3 \end{array}$$

$$\begin{array}{r} 12y = 48 \\ \frac{12}{12} \quad \frac{48}{12} \\ y = 4 \end{array}$$

$$\begin{array}{l}
 \text{1B. } 9r + q = 13 \\
 3r + 2q = -4
 \end{array}
 \xrightarrow{-2}
 \begin{array}{l}
 -18r - 2q = -26 \\
 3r + 2q = -4
 \end{array}
 \quad \begin{array}{l}
 (\times y) \\
 \hline
 \end{array}$$

$$\begin{array}{l}
 -15r = -30 \\
 \hline
 r = 2
 \end{array}
 \quad \begin{array}{l}
 (q, r) \\
 (-5, 2)
 \end{array}$$

$$\begin{array}{l}
 9r + q = 13 \\
 3r + 2q = -4
 \end{array}
 \xrightarrow{-3}
 \begin{array}{l}
 9r + q = 13 \\
 -9r - 6q = 12 \\
 \hline
 -5q = 25 \\
 \hline
 q = -5
 \end{array}$$

$$5x - 3y = 18 \xrightarrow{4}$$

$$2x + 4y = 12 \xrightarrow{3}$$

$\begin{array}{r} 141 \\ 10-21 \\ \hline \text{all} \end{array}$