

Systems of Linear Equations

In This Unit:

1. Graphically
2. Substitution
3. Linear Combination

No Bellwork
02/06/2012

Lesson 6.1 Graphically

What You Need to Know:

A linear system has more than one equation.

Example:

$$3x-2y=11$$

$$-x+6y=7$$

For an ordered pair to be a solution, it must check into **BOTH** equations of the system!

To Find a Solution Graphically:

1. Graph **BOTH** equations
2. Find where the lines cross
3. Check the point back into the equations

Graphically

Decide whether the ordered pair is a solution to the system.

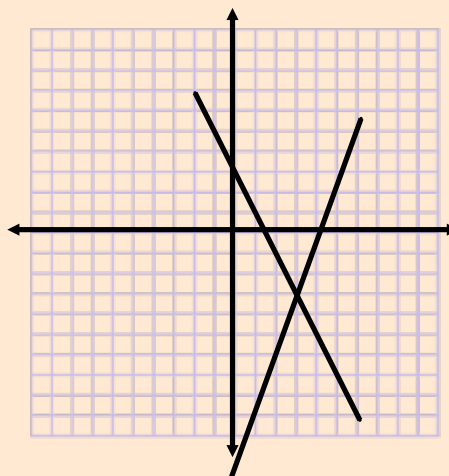
$$\begin{array}{l} 3x-2y=11 \\ -x+6y=7 \end{array} \quad (5,2)$$

$$\begin{array}{l} x+3y=15 \\ 4x+ y=6 \end{array} \quad (3,-6)$$

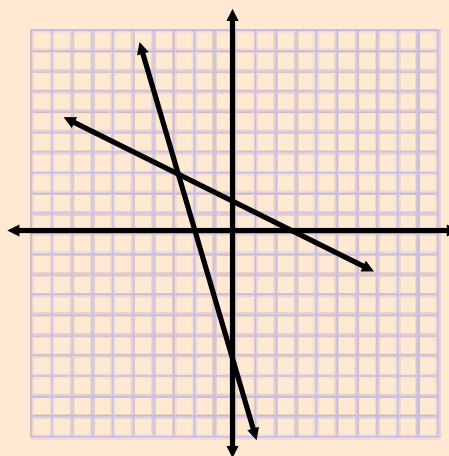
Graphically Cont.

Use the graph to solve the linear system. Check your solution!

$$y=3x-12$$
$$y=-2x+3$$



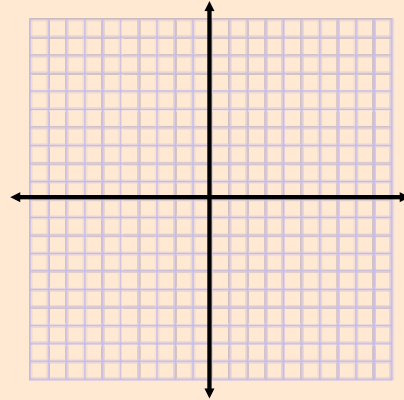
$$3x+y=-6$$
$$-x-2y=-3$$



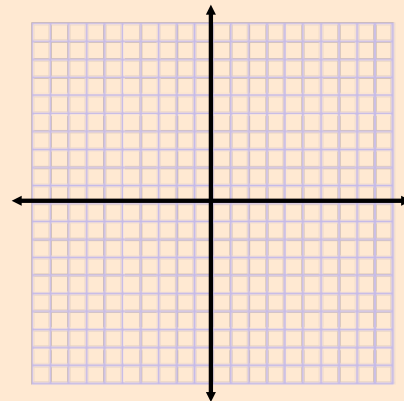
Graphically Cont.

Graph and check the linear system.

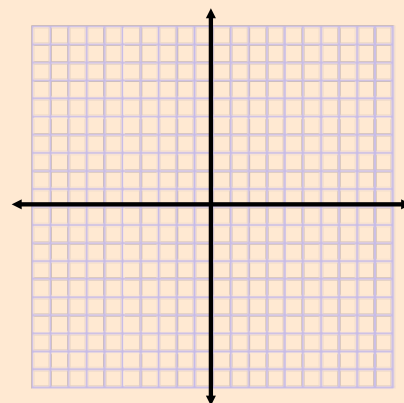
$$\begin{aligned}3x + y &= 11 \\ x - 2y &= 6\end{aligned}$$



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



$$\begin{aligned}x &= 3 \\ y &= -5\end{aligned}$$



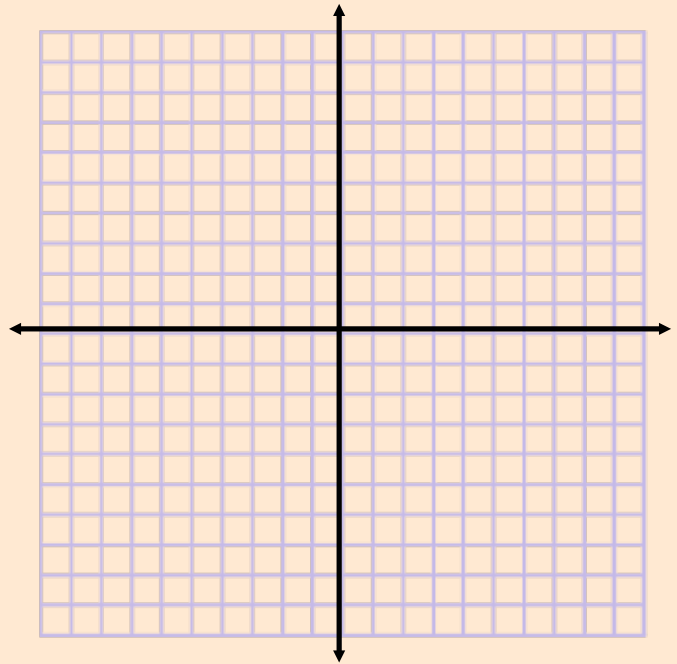
Homework Assignment

Worksheet "Solving Systems Graphically"

Bellwork
02/08/2012

Solve the system graphically.

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



Lesson 6.2

Substitution Method

What You Need to Know:

To use substitution, find a lonely variable!



The lonely variable is a variable with no number in front of it.

To Solve by Substitution:

1. Isolate a variable. [*star the new equation]
2. Substitute the new equation into the untouched equation.
3. Substitute the found value into the * equation.
4. Write your answer as an ordered pair and check!

Substitution Method

Solve the system using substitution. Check your answer!

$$y=x-4$$

$$4x+y=26$$

$$3x=9$$

$$x-y=17$$

$$3x+y=5$$

$$2x-y=10$$

$$x+2y=4$$

$$-x+y=-7$$

Last year you mowed grass and shoveled snow for 10 households. You earned \$200 per household mowing for the whole season and \$180 per household shoveling for the entire season. If you earned a total of \$1880 last year, how many households did you mow and shovel for?

Homework Assignment

Worksheet "Solving Systems by Substitution"

Bellwork

02/10/2012

Solve the system using substitution.

1. $2x - 3y = -2$

~~$4x + y = 24$~~

$$\begin{array}{r} 4x + y = 24 \\ -4x \quad -4x \end{array}$$

$\star y = -4x + 24$

$$2x - 3(-4x + 24) = -2$$

$$2x + 12x - 72 = -2$$

$$\begin{array}{r} 14x - 72 = -2 \\ +72 \quad +72 \end{array}$$

$$\frac{14x}{14} = \frac{70}{14}$$

$$x = 5$$

$$\rightarrow y = -4(5) + 24$$

$$y = -20 + 24$$

$$y = 4$$

$$(5, 4)$$

Lesson 6.3

Linear Combination Method

What You Need to Know:

Solving a System by Linear Combination:

1. Line like variables in columns?
2. Multiply one or both equations to cancel a variable when adding?
3. Add and solve for one variable!
4. Substitute this value into *either* of the original equations to solve for the other variable!
5. Write answer as an ordered pair and check!

Linear Combination Method

Solve the system using linear combination. Check your answer!

$$\begin{array}{r} -x+2y=-8 \\ x+6y=-16 \\ \hline 8y=-24 \\ 8 \quad 8 \\ \hline y=-3 \end{array} \qquad \begin{array}{r} x+6(-3)=-16 \\ x-18=-16 \\ +18 \quad +18 \\ \hline x=2 \end{array}$$

$(2, -3)$

$$\begin{array}{r} -1x+2y=5 \\ 2(5x-y=3) \\ \hline 11x \quad = \quad 11 \\ 11 \quad 11 \\ \hline x=1 \end{array} \qquad \begin{array}{r} +1x+2y=5 \\ +10x-2y=6 \\ \hline 11x \quad = \quad 11 \\ 11 \quad 11 \\ \hline x=1 \end{array} \qquad \begin{array}{r} +2y=5 \\ -1 \quad -1 \\ \hline 2y=4 \\ 2 \quad 2 \\ \hline y=2 \end{array}$$

$(1, 2)$

$$\begin{array}{r} 3x+5y=6 \\ -4x+2y=5 \\ \hline 12x+20y=24 \\ + \quad -12x+6y=15 \\ \hline 26y=39 \\ 26 \quad 26 \\ \hline y=1.5 \end{array}$$

$$\begin{array}{r} 3x+5(1.5)=6 \\ 3x+7.5=6 \\ -7.5 \quad -7.5 \\ \hline 3x=-1.5 \\ 3 \quad 3 \\ \hline x=-0.5 \end{array}$$

$(-0.5, 1.5)$

$$\begin{array}{r} 2u=4v+8 \\ 3v=5u-13 \\ \hline 5(2u-4v=8) \\ 2(-5u+3v=-13) \\ \hline 10u-20v=40 \\ + \quad -10u+6v=-26 \\ \hline -14v=14 \\ -14 \quad -14 \\ \hline v=-1 \end{array}$$

$$\begin{array}{r} 2u=4(-1)+8 \\ 2u=-4+8 \\ 2u=4 \\ 2 \quad 2 \\ \hline u=2 \end{array}$$

$(2, -1)$

There are 16 workers employed on a highway project, some at \$200 per day, and some at \$165 per day. The daily payroll is \$2745. Write a system to find the number of workers employed at each wage.

Homework Assignment

Worksheet "Solving Systems by Linear Combination"