Warm Up

$-76 > -102$
$-57-19 > -95-7$

1. Which function represents the linear pattern shown in the table? $m=3$

x	f(x)
1	-2
2	1
3	4
4	7
5	10

1   3   3

A. f(x) = 3x - 5
B. f(x) = 2x - 4
C. f(x) = x + 3
D. f(x) = x + 1

2. Which number is a solution to

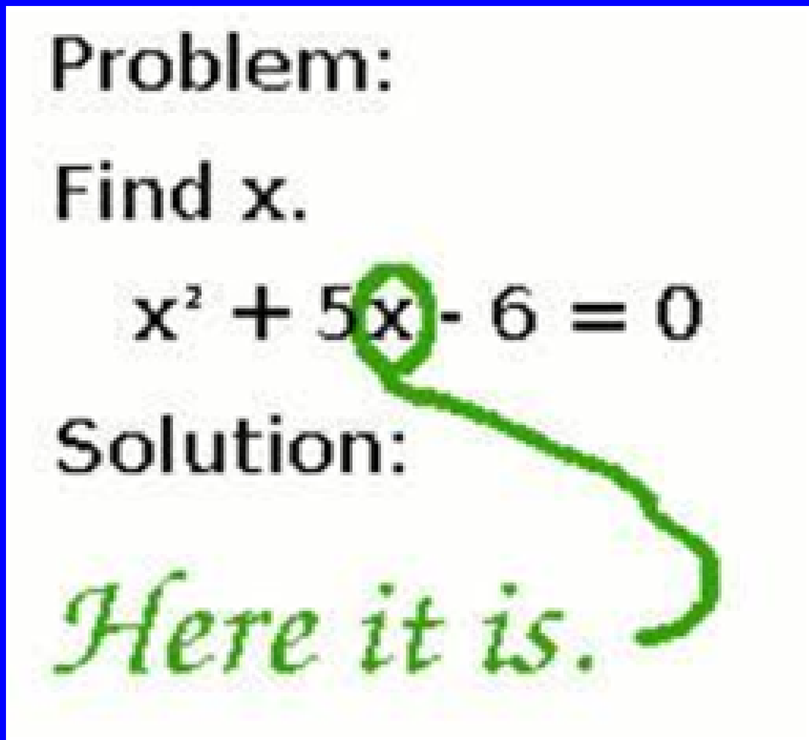
$3(-19)-19 > 5(-19)-7$

$3x - 19 > 5x - 7$

or

$6x - 27 > 30 + 3x$

A. -19
B. -5
C. 5
D. 19



Elimination

Objectives:

* You will be able to create and solve a system of equations by using the elimination method.

* You will be able to understand what the solutions represents.

What do you think of when you hear the word Elimination?

get rid of

subtract

replace

go away

What exactly are we eliminating when it comes to solving a system?

eliminate a variable

x or y

What do you notice when comparing these two equations?

$$
\begin{array}{rrcrcr}
 & 4x & + & \cancel{6y} & = & 32 \\
+ & 3x & - & \cancel{6y} & = & 3 \\
\hline
 & \frac{7x}{7} & & & = & \frac{35}{7}
\end{array}
$$

$x = 5$

$4(5) + 6y = 32$

$20 + 6y = 32$

$-20 \qquad -20$

$\frac{6y}{6} = \frac{12}{6}$

$y = 2$

$\boxed{(5,2)}$

Steps:

1. Put the equations into columns based on their variables.
2. Make sure you have a coefficient that is the same but with opposite signs.
3. Add the columns going down. This should eliminate one of the variables.
4. Once you have solved for one variable, plug that number back into one equation and solve for the other variable.

Example:

$$\begin{aligned} x + 3y &= 6 \\ + \quad x - 3y &= 12 \\ \hline \frac{2x}{2} &= \frac{18}{2} \end{aligned}$$

$x = 9$

$$9 + 3y = 6$$
$$-9 \qquad -9$$
$$\frac{3y}{3} = \frac{-3}{3}$$

$y = -1$

$\boxed{(9, -1)}$

Example:

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

$$\frac{3x}{3} = \frac{6}{3}$$

$x = 2$

$2 - y = 2$
$-2 \qquad -2$

$$\frac{-y}{-1} = \frac{0}{-1}$$

$y = 0$

$\boxed{(2,0)}$

Example:

$$
\begin{array}{r}
\cancel{4x} - 30y = -20 \\
+ \quad \cancel{-4x} + 5y = -30 \\
\hline
\end{array}
$$

$$\frac{-25y}{-25} = \frac{-50}{-25}$$

$y = 2$

$4x - 30(2) = -20$

$4x - 60 = -20$

$\quad +60 \quad +60$

$$\frac{4x}{4} = \frac{40}{4}$$

$x = 10$

$\boxed{(10,2)}$

Example:

$$3x - 5y = -35$$

$$-1(2x - 5y) = (-30) - 1$$

$$3x - \cancel{5y} = -35$$

$$+ \quad -2x + \cancel{5y} = 30$$

$$x = -5$$

$$x = -5$$

$$3(-5) - 5y = -35$$

$$-15 - 5y = -35$$

$$+15 \qquad +15$$

$$\frac{-5y}{-5} = \frac{-20}{-5}$$

$$y = 4$$

$$\boxed{(-5, 4)}$$

Example:

$$4x + 5y = 7$$

$$-1(8x + 5y) = (9)-1$$

$$\begin{aligned} 4x + \cancel{5y} &= 7 \\ + \ -8x - \cancel{5y} &= -9 \end{aligned}$$

$$\frac{-4x}{-4} = \frac{-2}{-4}$$

$$x = \frac{1}{2}$$

$$4\left(\tfrac{1}{2}\right) + 5y = 7$$

$$\begin{aligned} 2 + 5y &= 7 \\ -2 \quad & \ -2 \end{aligned}$$

$$\frac{5y}{5} = \frac{5}{5}$$

$$y = 1$$

$$\boxed{\left(\tfrac{1}{2}, 1\right)}$$

Example:

$$6x - 2y = 24$$

$$-2(3x + 4y) = (27)-2$$

$$\cancel{6x} - 2y = 24$$

$$+ \; \cancel{-6x} - 8y = -54$$

$$\frac{-10y}{-10} = \frac{-30}{-10}$$

$$y = 3$$

$$3x + 4(3) = 27$$

$$3x + 12 = 27$$

$$-12 \quad -12$$

$$\frac{3x}{3} = \frac{15}{3}$$

$$x = 5$$

$$\boxed{(5, 3)}$$

Example:

$$2x + 3y = 13$$

$$-2(x - 4y) = (-10)\,-2$$

$$\cancel{2x} + 3y = 13$$

$$+\;\cancel{-2x} + 8y = 20$$

$$\frac{11y}{11} = \frac{33}{11}$$

$$y = 3$$

$$2x + 3(3) = 13$$

$$2x + 9 = 13$$

$$-9 \quad -9$$

$$\frac{2x}{2} = \frac{4}{2}$$

$$x = 2$$

$$\boxed{(2,3)}$$

Example:

$$-2(x - 3y) = (0)\,-2$$

$$2x + 20y = 26$$

$$\cancel{-2x} + 6y = 0$$

$$+ \quad \cancel{2x} + 20y = 26$$

$$\frac{26y}{26} = \frac{26}{26}$$

$$y = 1$$

$$x - 3(1) = 0$$

$$x - 3 = 0$$

$$+3 \quad +3$$

$$x = 3$$

$$\boxed{(3,1)}$$

Which method would be the easiest to use on the following problems?

1. $y = 3x - 4$ graph
   $y = 4x - 6$ substitution

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

3. $6(2x + 5y) = 7$
   $5(4x - 6y) = -2$
   elimination

4. $y = 1/2x + 3$ graph or
   $2x = y + 3$ substitution

5. $4x - 7y = -6$ elimination
   $-4x + 3y = -2$

6. $x = 3y + 4$
   $x + 9y = 16$
   Substitution

You can now:

* Create and solve a system of equations and understand what it represents.

Elimination Practice

pg. 352 #'s 11, 13, 15, 25, 29
pg. 358 #'s 7-13 odd