System of Equations 3

Goal:

- to solve a system of equations using elimination method

The third method for solving systems is called the elimination method. It gets its name because algebraically we eliminate one variable.

Solve: $x+2y=7$ (1)
$-x+4y=11$ (2)

Look at the equations and see if any variables have the same number infront.

$$\begin{array}{r} x+2y=7 \\ +\ -x+4y=11 \\ \hline 0\quad 6y=18 \end{array}$$

Add or subtract the equations to eliminate one variable.

"x" is eliminated, now solve for "y"

$$\frac{6y}{6}=\frac{18}{6}$$

$$y=3$$

Substitute $y=3$ into either equation

$$x+2y=7 \quad (1)$$

$$x+2(3)=7$$

$$x+6-6=7-6$$

$$x=1$$

Solution $(1,3)$

Solve: $2x+3y=11$ (1)
$x+3y=13$ (2)

(1)-(2)
$$\begin{array}{rl} & 2x+3y=11 \\ - & x+3y=13 \\ \hline & x=-2 \end{array}$$

plug $x=-2$ into either equation

$$x+3y=13 \quad (2)$$
$$-2^{+2}+3y=13^{+2}$$
$$\frac{3y}{3}=\frac{15}{3}$$
$$y=5$$

Solution $(-2,5)$

Solve: $x-2y=4$
$2x+3y=8$

① ×2 ② $\quad 2x-4y=8$ ①

$$2x-4y=8 \quad (1)$$
$$-\quad 2x+3y=8 \quad (2)$$

$$-7y=0$$
$$\frac{-7y}{-7}=\frac{0}{-7}$$
$$y=0$$

sub. $y=0$ into an equation

$$x-2y=4 \quad (1)$$
$$x-2(0)=4$$
$$x=4$$

Solution $(4,0)$

Solve: $-4x+3y+2=0$ ①
$6x-5y=-2$ ②

$-4x+3y=-2$ ①
$6x-5y=-2$ ②

Look at coefficient of each variable and try to find an LCM. (choose easiest)

4, 6 or 3, 5

$2^2, 2\cdot3$ 3, 5

$LCM = 2^2\cdot3 = 12$ $LCM = 3\cdot5$

① $\times3$ $-12x+9y=-6$

② $\times2$ $+\ 12x-10y=-4$

$-y=-10$

$y=10$

sub $y=10$ into an equation

$-4x+3y=-2$ ①

$-4x+3(10)=-2$

$-4x+30=-2$ -30 -30

$-4x=-32$

$x=8$

$(8, 10)$

Homework Handout #9-12

LCM 14, 18

$14 = 2 \cdot 7$

$18 = 2 \cdot 9$

$= 2 \cdot 3^2$

$LCM = 2 \cdot 3^2 \cdot 7$

$= 126$