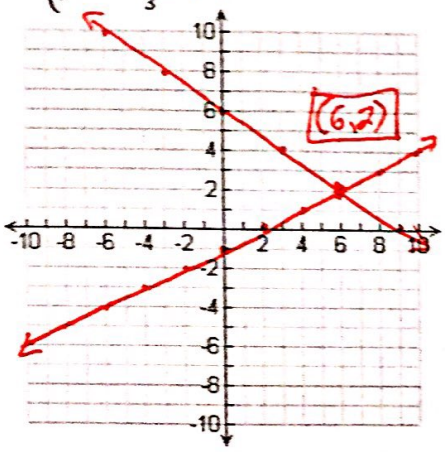
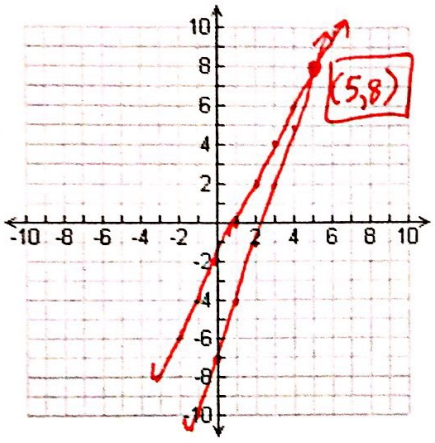
Solving Systems Review

Solve the system by graphing.

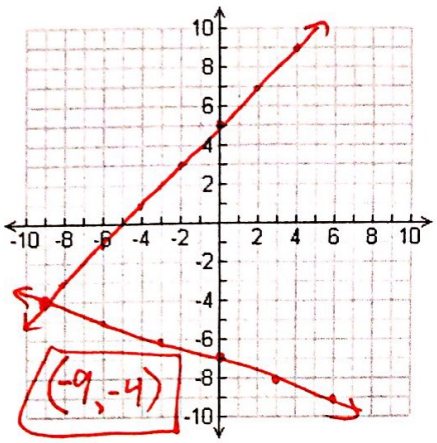
1) $\begin{cases} y + 1 = \frac{1}{2}x \\ y = -\frac{2}{3}x + 6 \end{cases}$ → $y = \frac{1}{2}x - 1$



2) $\begin{cases} 2y + 4 = 4x \\ y = 3x - 7 \end{cases}$ → $\frac{2y}{2} = \frac{4x}{2} - \frac{4}{2}$ → $y = 2x - 2$

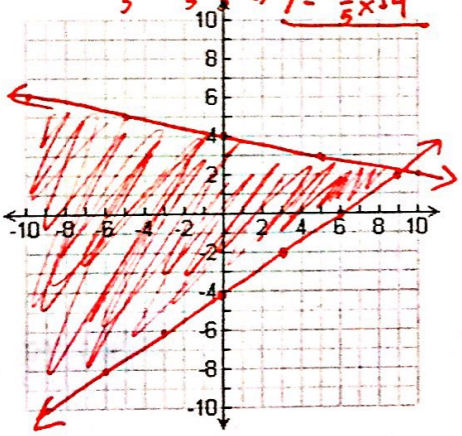


3) $\begin{cases} -x = 5 - y \\ y = -\frac{1}{3}x - 7 \end{cases}$ → $\begin{matrix} -x+y=5 \\ +x \quad +x \end{matrix}$ → $y = x + 5$



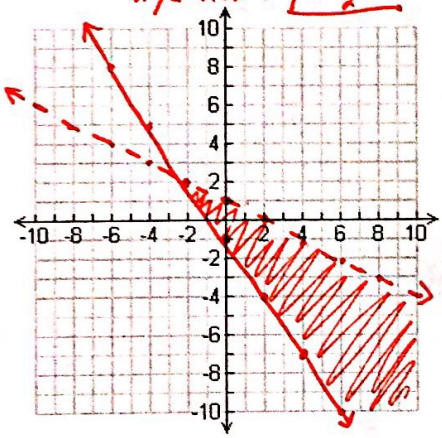
4) $\begin{cases} 2x - 3y \leq 12 \\ x + 5y \leq 20 \end{cases}$ → $\frac{-3y}{-3} \leq \frac{-2x+12}{-3}$ → $y \geq \frac{2}{3}x - 4$ (FLIP THE SIGN)

$\frac{5y}{5} \leq \frac{-x+20}{5}$ → $y \leq -\frac{1}{5}x + 4$



5) $\begin{cases} 3x + 2y \geq -2 \\ x + 2y < 2 \end{cases}$ → $2y \geq -3x - 2$ → $y \geq -\frac{3}{2}x - 1$

$2y < -x + 2$ → $y < -\frac{1}{2}x + 1$



6) Ray has $20 in his bank account and deposits $60 per month. Will has $560 in his bank account but withdraws $30 per month.

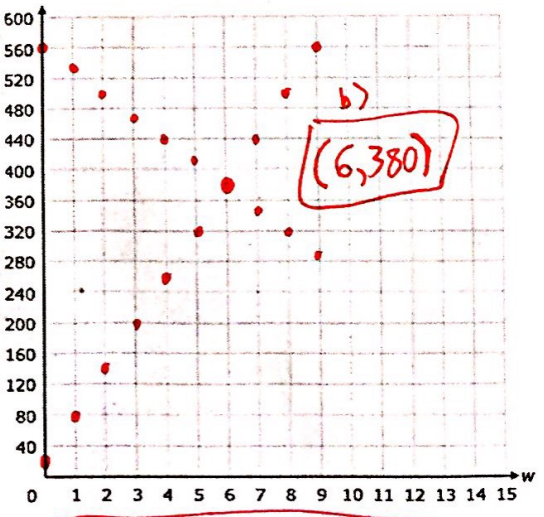
a) Write a system of equations.

b) Graph them and find the intersection.

c) Explain what the numbers in your solution represent.

a) $y = 20 + 60x$

$y = 560 - 30x$



c) After 6 months, both will have $380 in their account.

7) Choose two problems from #1 – 6, then check your solution by substituting the numbers back into both original equations.

#2

$2(8) + 4 = 4(5)$

$16 + 4 = 20$

$20 = 20$ ✓

$8 = 3(5) - 7$

$8 = 15 - 7$

$8 = 8$ ✓

#6

$380 = 20 + 60(6)$

$380 = 20 + 360$

$380 = 380$ ✓

$380 = 560 - 30(6)$

$380 = 560 - 180$

$380 = 380$ ✓

Solve by substitution. Don't forget to find <u>both</u> x and y!!!

8) $\begin{cases} y = -x + 10 \\ y = 6x + 59 \end{cases}$

$-x+10 = 6x+59$
$+x \quad +x$
$10 = 7x+59$
$-59 \quad -59$
$\frac{-49}{7} = \frac{7x}{7}$
$-7 = x$

$y = 6(-7)+59$
$y = -42+59$
$y = 17$

(-7, 17)

9) $\begin{cases} -3x + 5y = 0 \\ 3y = 3x - 18 \end{cases}$ $\div 3$

$y = x - 6$

$-3x + 5(x-6) = 0$
$-3x + 5x - 30 = 0$
$+30 \quad +30$
$\frac{2x}{2} = \frac{30}{2}$ $x = 15$

$y = 15 - 6$
$y = 9$

(15, 9)

10) $\begin{cases} 2x + y = 1 \\ y + 2x = 5 \end{cases}$

$y = 5 - 2x$

$2x + (5-2x) = 1$
$5 = 1$

No Solution

11) There are 100 members in the US Senate. Currently, there are four times as many men as women. Write a system of equations, solve it, and describe what the numbers in your solution represent.

$4W = M$
$M + W = 100$
$4W + W = 100$
$5W = 100$ $W = 20$

$4(20) = M$
$80 = M$

80 Men, 20 Women

Solve by elimination. Don't forget to find <u>both</u> x and y!!!

12) $\begin{cases} x + 4y = 9 \\ 4y = 19 - 3x \end{cases}$

$+3x \quad +3x$
$3x + 4y = 19 \rightarrow 3x + 4y = 19$
$-1(x + 4y = 9) \rightarrow -x - 4y = -9$
$\frac{2x}{2} = \frac{10}{2}$
$x = 5$

$5 + 4y = 9$
$4y = 4$
$y = 1$

(5, 1)

13) $\begin{cases} 2x + 6y = 22 \\ 3x - 4y = 7 \end{cases}$ $\times 3 \rightarrow 6x + 18y = 66$; $\times -2 \rightarrow -6x + 8y = -14$

$26y = 52$
$y = 2$

$2x + 6(2) = 22$
$2x + 12 = 22$
$2x = 10$
$x = 5$

(5, 2)

14) Check your answer for one of the problems from #12 -13 by plugging the numbers into **both** original equations.

12) $5 + 4(1) = 9$
$5 + 4 = 9$
$9 = 9$ ✓

$4(1) = 19 - 3(5)$
$4 = 19 - 15$
$4 = 4$ ✓

15) Farmer Ben has 22 animals – all are either ducks or cows. Each cow has 4 legs, each duck has 2 legs, and there are 56 legs all together. Write and solve a system to find out how many of each type of animal Farmer Ben has.

$-2(D + C = 22) \rightarrow -2D - 2C = -44$
$2D + 4C = 56 \rightarrow 2D + 4C = 56$
$2C = 12$
$C = 6$

$6 + D = 22$
$D = 16$

6 cows
16 ducks

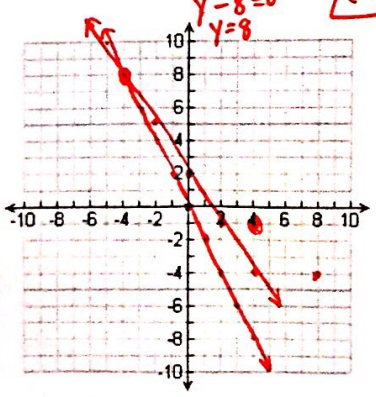
<u>Solve by Method of Your Choice:</u>

16) $\begin{cases} 6x + 4y = 8 \\ y + 2x = 0 \end{cases}$ $y = -2x$; $y = -\frac{3}{2}x + 2$

$\rightarrow 6x + 4y = 8$
$\rightarrow -8x - 4y = 0$
$-2x = 8$
$x = -4$

$y + 2(-4) = 0$
$y - 8 = 0$
$y = 8$

(-4, 8)

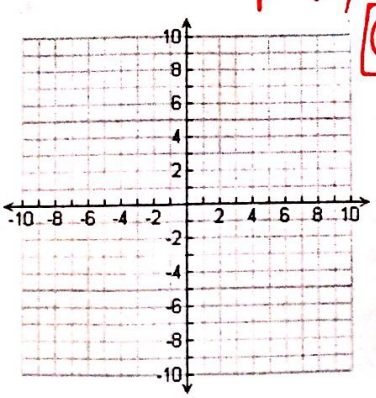


17) $\begin{cases} 4x = 20y \\ -2x + 20y = -10 \end{cases}$

$-2x + 4x = -10$
$2x = -10$
$x = -5$

$4(-5) = 20y$
$-20 = 20y$
$-1 = y$

(-5, -1)



18) $\begin{cases} x + 2y = 2 \\ y = x + 4 \end{cases}$ (2, 0) (0, 1)

$x + 2(x+4) = 2$
$x + 2x + 8 = 2$
$-8 \quad -8$
$3x = -6$
$x = -2$

$y = -2 + 4$
$y = 2$

(-2, 2)