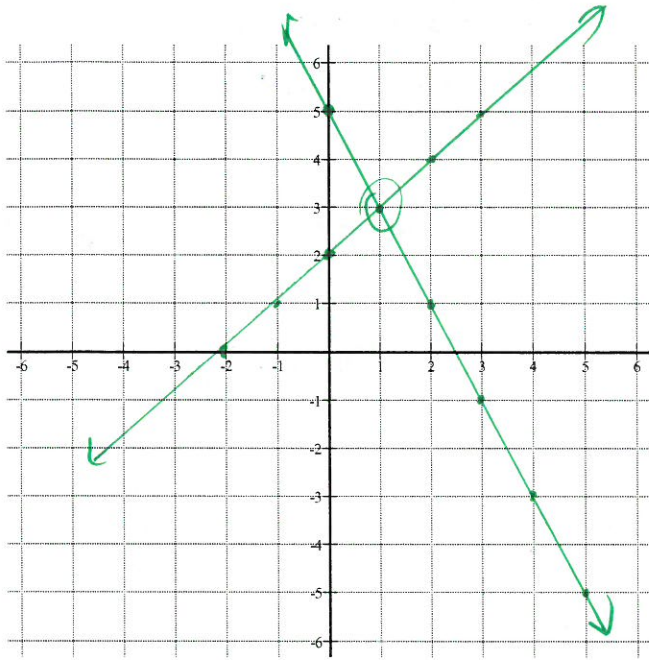


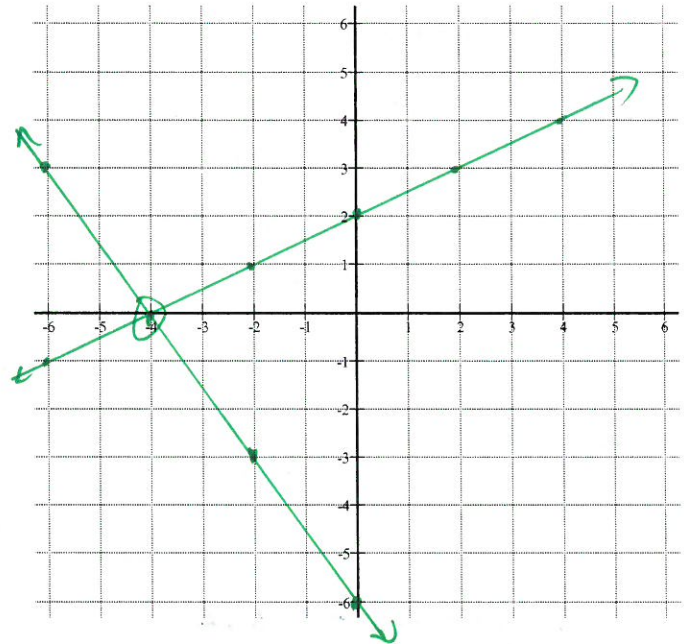
1. Solve each system of linear equations graphically.

a) $y = -2x + 5$
 $y = x + 2$



Solution: (1, 3)

b) $3x + 2y = -12$ $2y = -3x - 12$ $y = -\frac{3}{2}x - 6$
 $x - 2y + 4 = 0$ $2y = x + 4$ $y = \frac{1}{2}x + 2$



Solution: (-4, 0)

2. Verify each solution from question #1.

$(1, 3) \stackrel{?}{=} -2(1) + 5$ $(1, 3) \stackrel{?}{=} (1) + 2$
 $3 = 3 \checkmark$ $3 = 3 \checkmark$

$3(-4) + 2(0) \stackrel{?}{=} -12$ $(-4) - 2(0) + 4 \stackrel{?}{=} 0$
 $-12 + 0$ $-4 + 4$
 $-12 = -12 \checkmark$ $0 = 0 \checkmark$

3. How many solutions does each linear system have? Justify (showing all work) your answers without graphing or solving.

a) $2x + 3y = 20$
 $6x - y = 20 \rightarrow y = 6x - 20$
 $3y = -2x + 20$
 $y = -\frac{2}{3}x + \frac{20}{3}$
 different slopes
 $\therefore 1$ solution

b) $x - 5y = 1$
 $-x + 5y = 1 \rightarrow y = x - 1$ $y = 1 + 1$
 $y = \frac{1}{5}x - \frac{1}{5}$ $y = \frac{1}{5}x + \frac{1}{5}$
 slopes same, y-int different
 $\therefore$ no solutions

c) $x + 3y = 5$
 $2x + 6y = 10 \xrightarrow{\div 2} x + 3y = 5$
 coincident lines
 $\therefore$ infinite solutions

4. Solve each system of linear equations by substitution:

a) $4x + y = 1$

$x = 2y - 20$

$4(2y - 20) + y = 1$

$8y - 80 + y = 1$

$9y = 81$

$y = 9$

$x = 2(9) - 20$

$x = -2$

$\boxed{(-2, 9)}$

b) $-3x + y = -3$

$5x - 2y = 10$

$\rightarrow y = 3x - 3$

$5x - 2(3x - 3) = 10$

$5x - 6x + 6 = 10$

$-x = 4$

$x = -4$

$y = 3(-4) - 3$

$y = -15$

$\boxed{(-4, -15)}$

5. Solve the system of linear equations by substitution:

$\left(\frac{x}{6} + \frac{y}{3} = 6\right) \rightarrow x + 2y = 36 \rightarrow x = 36 - 2y$

$3x - 2y = 12$

$3(36 - 2y) - 2y = 12$

$108 - 6y - 2y = 12$

$108 - 8y = 12$

$-8y = -96$

$y = 12$

$x = 36 - 2(12)$

$x = 12$

$\boxed{(12, 12)}$

6. Maria has a total of 20 nickels and quarters. She has four times as many nickels as quarters. How much money does Maria have? Write a system of linear equations and solve by substitution.

Let $n = \# \text{ nickels}$
 $q = \# \text{ quarters}$

$n + q = 20$

$q = 4n$

$n + 4n = 20$

$5n = 20$

$n = 4$

$q = 4(4)$

$q = 16$

$\$ 4(.05) + 16(.25)$
 $= \boxed{\$ 4.20}$

or?

$n = 4q$

$4q + q = 20$

$5q = 20$

$q = 4$

$n = 4(4) = 16$

$4(.25) + 16(.05)$

$= \boxed{\$ 1.80}$

7. Solve each system of linear equations by elimination:

$$\begin{array}{r} \text{b)} \quad x + y = 4 \\ + \quad x - y = 10 \\ \hline \end{array}$$

$$2x = 14$$

$$x = 7$$

$$(7) + y = 4$$

$$y = -3$$

$$\boxed{(7, -3)}$$

$$\begin{array}{r} \text{b)} \quad y + 6 = x \rightarrow x + y = 6 \\ y = -3x + 2 \rightarrow 3x + y = 2 \quad + \\ \hline \end{array}$$

$$4x = 8$$

$$x = 2$$

$$y = -3(2) + 2$$

$$y = -4$$

$$\boxed{(2, -4)}$$

8. Solve each system of linear equations by elimination:

$$\begin{array}{r} \text{a)} \quad 2x + y = 15 \xrightarrow{\times 4} 8x + 4y = 60 \\ 5x - 6y = -22 \xrightarrow{\times 2} 10x - 12y = -44 \\ \hline \end{array}$$

$$-4x = 16$$

$$x = -4$$

$$8(-4) + y = 60$$

$$y = 72$$

$$\boxed{(-4, 72)}$$

$$\begin{array}{r} \text{b)} \quad 3x + 2y = 0 \xrightarrow{\times 7} 21x + 14y = 0 \\ 8x + 7y = 5 \xrightarrow{\times 2} 16x + 14y = 10 \\ \hline \end{array}$$

$$5x = -10$$

$$x = -2$$

$$3(-2) + 2y = 0$$

$$2y = 6$$

$$y = 3$$

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

9. Two numbers differ by five. Four times the smaller number is five less than triple the larger. Find the numbers by writing a system of linear equations and solving by elimination.

Let $x = \text{smaller \#}$
 $y = \text{larger \#}$

$$y - x = 5$$

$$4x = 3y - 5$$

$$-x + y = 5$$

$$4x - 3y = -5$$

$$\begin{array}{r} -x + y = 5 \\ \times 3 \rightarrow -3x + 3y = 15 \end{array} \quad +$$

$$x = 10$$

$$y - (10) = 5$$

$$y = 15$$

The $\#s$ are 10 + 15