1. (10 points) Consider the points $(-4,-5)$ and $(-5,-8)$.
   a. (4 points) What is the slope between the two points?

$$m = \frac{-5-(-8)}{-4-(-5)} = \frac{-5+8}{-4+5} = \frac{3}{1} = \boxed{3}$$

   b. (6 points) Write the equation of the line between the two points in point-slope form AND slope-intercept form.

$$y-(-5) = 3(x-(-4))$$
$$y+5 = 3(x+4)$$
$$y+5 = 3x+12$$

2. (14 points) Find the slopes of each equation in the given system and determine if the pair of equations are parallel, perpendicular, or neither.

a. $\begin{cases} y = 2-\frac{1}{2}x & (1) \\ 2x+4y=12 & (2) \end{cases}$

Slope of eqn (1): $\boxed{m=-\frac{1}{2}}$

Slope of eqn (2)

$2x+4y=12$

$4y = 12-2x$

$y = 3-\frac{2}{4}x$

$y = 3-\frac{1}{2}x$

$\boxed{m=-\frac{1}{2}}$

the lines are parallel b/c slopes are the same

b. $\begin{cases} 3x-5y=-1 & (1) \\ 5x+3y=2 & (2) \end{cases}$

Slope of eqn (1)

$3x-5y=-1$

$3x+1=5y$

$\frac{3}{5}x+\frac{1}{5}=y$

$m=\frac{3}{5}$

Slope of eqn (2)

$5x+3y=2$

$3y=2-5x$

$y=\frac{2}{3}-\frac{5}{3}x$

$m=-\frac{5}{3}$

Slopes are negative reciprocals so lines are perpendicular

3. (12 points) For $f(x) = |5 - x|$

   a. (3 points) What is the domain of the function?

   All real numbers : $(-\infty, \infty)$

   b. (9 points) Find $f(4), f(-8)$, and $f(0)$

$f(4) = |5-4| = 1$

$f(0) = |5-0| = 5$

$f(-8) = |5-(-8)| = |5+8| = 13$

4. (12 points) Jolene bought a total of 56 stamps for \$19.44. She bought a combination of \$0.39 stamps and \$0.24 cent stamps. Write the system of equations for the problem and solve the system.

x = 24¢ stamps
y = 39¢ stamps

Equations

$56 = x + y$

$x(0.24) + y(.39) = 19.44$

$x + y = 56$

$x = 56 - y$

$24x + 39y = 1944$

$24(56 - y) + 39y = 1944$

$1344 - 24y + 39y = 1944$

$15y = 600$

$y = 40$

$x = 16$

5. (12 points) Solve the system by the elimination method. $\begin{cases} 3x - 5y = 1 \\ 6x - 10y = 4 \end{cases}$

$-2(3x - 5y = 1)$

$6x - 10y = 4$

$\rightarrow \quad -6x + 10y = -2$

$6x - 10y = 4$

$0 = 2$

FALSE!

So no soln

6. (12 points) Solve the system by either elimination or substitution method. $\begin{cases} y = 9 - 6x \\ -6x + 3y = 15 \end{cases}$

$\begin{cases} y = 9 - 6x \\ -6x + 3y = 15 \end{cases}$

$-6x + 3(9 - 6x) = 15$

$-6x + 27 - 18x = 15$

$-24x = -12$

$x = \frac{-12}{-24}$

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

$y = 9 - 6 \cdot (\frac{1}{2})$

$y = 9 - 3$

$\boxed{y = 6}$

7. (14 points) Consider the system of inequalities: $\begin{cases} x \le 4y + 3 \\ x + y > 0 \end{cases}$

a. Find the x-intercept and y-intercept of each inequality.
b. Plot the inequalities and label the intercepts on a graph
c. Pick a test point for each inequality and show your work.

Use this space for your work and graphing. You may graph on a separate sheet of paper.

eqn (1)

a) x-int: $y=0$ $x = 0+3$ $x=3$ $\boxed{(3,0)}$

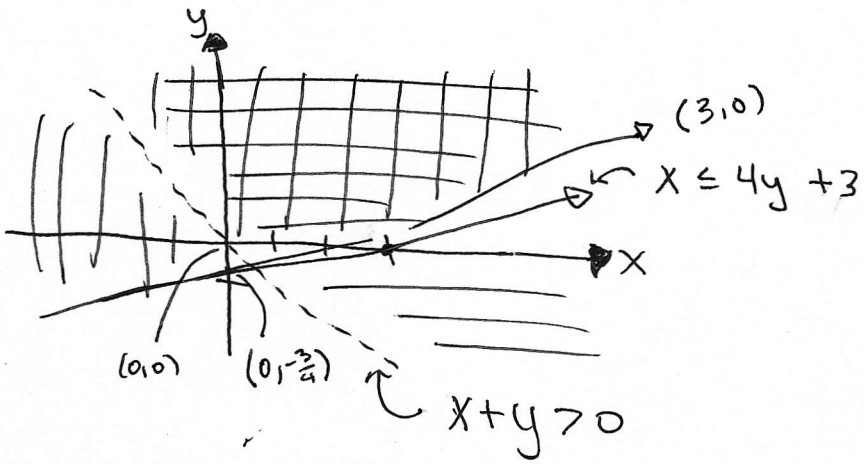
y-int: $x=0$ $0=4y+3$ $y=-3/4$ $\boxed{(0,-3/4)}$

eqn (2)

x-int: $y=0$ $x+0=0$ $x=0$ $\boxed{(0,0)}$

y-int: $x=0$ $0+y=0$ $\boxed{(0,0)}$

b)



c) Test Points

(1,1)

$1 \le 4(1)+3$

$1 \le 7$ ✓ true

(1,1)

$1+1>0$

$2>0$ ✓ true

8. (14 points) Consider the system of equations. $\begin{cases} 2x - y = 4 \\ 2x + 3y = 12 \end{cases}$

a. Find the x-intercepts and y-intercepts of each equation.
b. Plot the line and label the intercepts on a graph.
c. Does the system have a solution, no solution or infinite solutions?

Use this space for your work and graphing. You may graph on a separate sheet of paper.

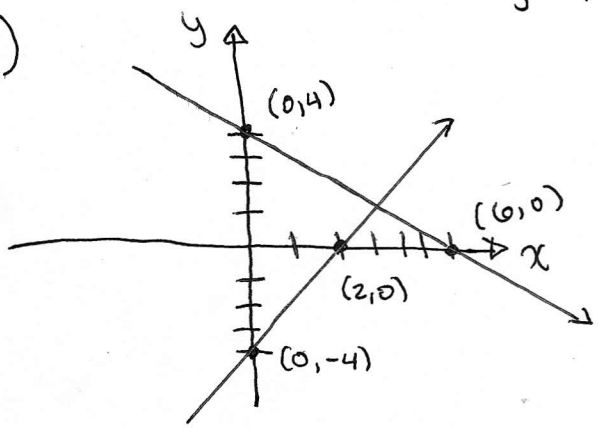
a) x-int: $y=0$ $2x = 4$, $x = 2$, $(2,0)$

y-int: $x=0$ $-y = 4$, $y = -4$, $(0,-4)$ } eqn 1

x-int: $y=0$ $2x = 12$, $x = 6$, $(6,0)$

y-int: $x=0$ $3y = 12$, $y = 4$, $(0,4)$ } eqn 2

b)



Extra. Answer the following questions for the line $y = 8$.

a. (2 points) What is the slope of the line

$m = 0$

b. (4 points) Write the equation of a line that is perpendicular to the equation. (Several answers.)

$x = 3$

c. (4 points) Write the equation of a line that is parallel to the equation. (Several answers.)

$y = 4$