Chapter 4 Worksheet

1. Write each solution as an ordered pair:

   a. $x=5$ and $y=7$. $\Rightarrow (5,7)$

   b. $x=6$ and $y=-1$. $\Rightarrow (6,-1)$

   c. $y=-3$ and $x=5$ $\Rightarrow (5,-3)$

2. Decide whether the ordered pair is a solution of the given equation:

   a. $(3,2); 2x+3y=12$ $2(3)+3(2) \stackrel{?}{=} 12$, $6+6=12$, yes. $(3,2)$ is a soln.

   b. $(-2,-7); 2x+3y=12$ $2(-2)+3(-7) \stackrel{?}{=} 12$, $-4+(-21) \stackrel{?}{=} 12$, no, so $(-2,-7)$ is not a soln.

3. Decide whether or not the ordered pairs satisfy the equation $5x+2y=20$.

   a. $(0,10)$ $5(0)+2(10) \stackrel{?}{=} 20$, $0+20=20$, True, yes $(0,10)$ is a soln.

   b. $(2,-5)$ $5(2)+2(-5) \stackrel{?}{=} 20$, $10+(-10) \stackrel{?}{=} 20$, $0 \stackrel{?}{=} 20$, False, $(2,-5)$ is not a soln.

   c. $(3,2)$ $5(3)+2(2) \stackrel{?}{=} 20$, $15+4 \stackrel{?}{=} 20$, $19 \stackrel{?}{=} 20$ False, No, $(3,2)$ is not a soln.

   d. $(-4,20)$ $5(-4)+2(20) \stackrel{?}{=} 20$, $-20+40 \stackrel{?}{=} 20$, $20 \stackrel{?}{=} 20$, true, yes $(-4,20)$ is a soln.

4. Complete the given ordered pairs for the equation $y=2x-9$:

   a. $(5, \underline{y}) \Rightarrow (5, \underline{1})$ $y=2(5)-9$, $=10-9$, $=1$

   b. $(2, \underline{y})$ $\Downarrow$ $(2, \underline{-5})$ $y=2(2)-9$, $y=4-9$, $=-5$

   c. $(\underline{x}, 7) \Rightarrow (\underline{8}, 7)$ $7=2x-9$, $+9 \quad +9$, $\frac{16}{2}=\frac{2x}{2}$, $8=x$

   d. $(\_, -13) \Rightarrow (\underline{-2}, -13)$ $-13=2x-9$, $+9 \quad +9$, $\frac{-4}{2}=\frac{2x}{2}$, $-2=x$

5. Complete the given table of ordered pairs for the equation $x-2y=8$.

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

x	y
2	-3
10	1
8	0
4	-2

$2-2y=8$, $-2\quad -2$, $-2y=6$, $\frac{-2y}{-2}=\frac{6}{-2}$, $y=-3$

$10-2y=8$, $-10\quad -10$, $-2y=-2$, $\frac{-2y}{-2}=\frac{-2}{-2}$, $y=1$

$x-2(0)=8$
$x=8$

6. Complete the given table of ordered pairs for the equation $x=3$.

x is always 3.

x	y
3	-2
3	6
3	0
3	-5

6. Explain why it would be easier to find the corresponding y value for $x=\frac{1}{4}$ in the equation $y=8x-2$ than it would be for $x=\frac{1}{9}$.

$\frac{1}{4}$ times 8 is an integer (2) whereas $\frac{1}{9}$ times 8 is a fraction

$y=8\left(\frac{1}{4}\right)-2$
$=\frac{8}{1}\cdot\frac{1}{4}-2$
$=2-2$
$=0$

$y=8\left(\frac{1}{9}\right)-2 \Rightarrow \frac{8}{9}-\frac{18}{9}$
$=\frac{8}{9}-2\cdot\frac{9}{9} \quad =\frac{-10}{9}$

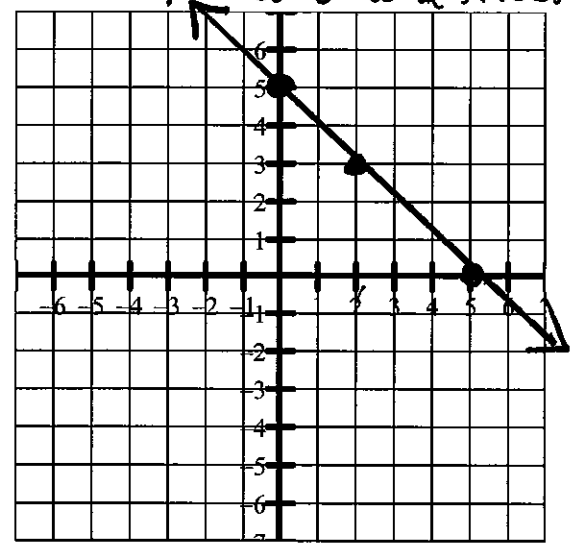
Complete the ordered pairs and then graph the line.

$x+y=5$

$(0, 5)$ → $0+y=5$, $y=5$

$(5, 0)$ → $x+0=5$, $x=5$

$(2, 3)$ → $2+y=5$, $-2\quad -2$, $y=3$



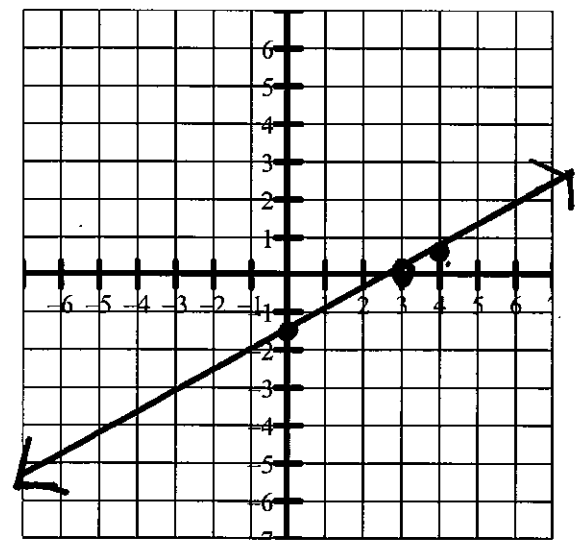
9. Complete the ordered pairs and then graph the line.

$x=2y+3$

$(3, 0)$ → $x=2(0)+3$, $x=0+3$, $x=3$

$(0, -1\frac{1}{2})$ → $0=2y+3$, $-3\quad -3$, $\frac{-3}{2}=\frac{2y}{2}$, $-\frac{3}{2}=y$ or $-1\frac{1}{2}=y$

$\left(4, \frac{1}{2}\right)$ → $x=2\left(\frac{1}{2}\right)+3$, $x=1+3$, $x=4$



10. Find the x and y-intercepts for each equation:

a. $2x-3y=24$

x-intercept: $(x, 0) \Rightarrow (12, 0)$

$2x - 3(0) = 24$

$2x = 24$

$x = 12$

y-intercept: $(0, y) \Rightarrow (0, -8)$

$2(0) - 3y = 24$

$-3y = 24$

$y = -8$

b. $-3x = 48 - 8y$

x-intercept: $(x, 0) \Rightarrow (-16, 0)$

$-3x = 48 - 8(0)$

$\frac{-3x}{-3} = \frac{48}{-3}$ $x = -16$

y-intercept: $(0, y) \Rightarrow (0, 6)$

$-3(0) = 48 - 8y$

$0 = 48 - 8y$

$-48 \quad -48$

$\frac{-48}{-8} = \frac{-8y}{-8}$

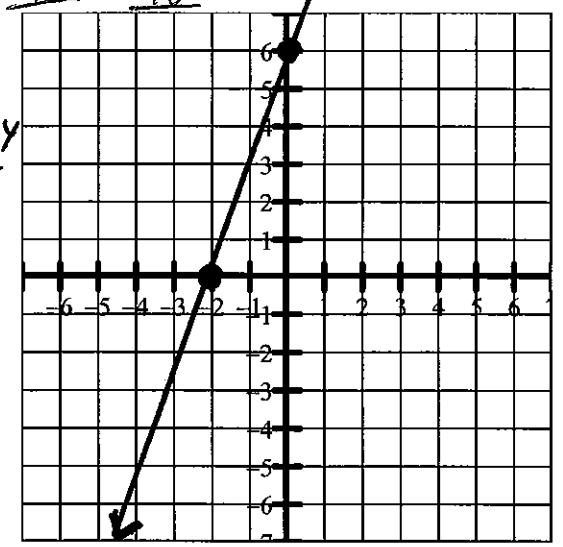
$6 = y$

11. Graph each linear equation using the Intercept Method:

a. $-3x + y = 6$

Checkpoint: pick any x value & solve for y.

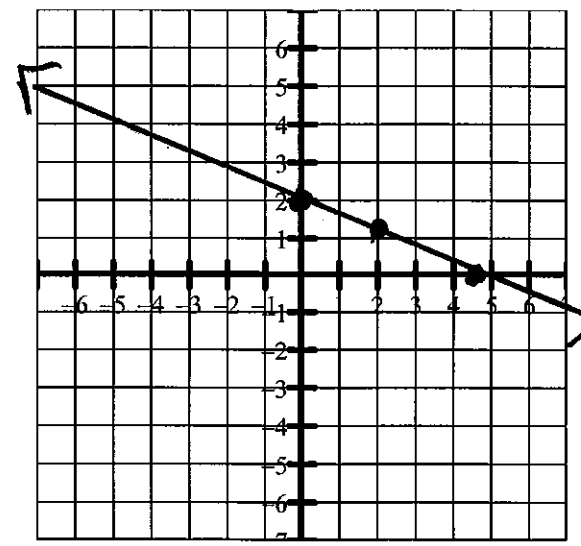
$(x, 0)$	$(0, y)$	$(1, y)$
$-3x + 0 = 6$	$-3(0) + y = 6$	$-3(1) + y = 6$
$-3x = 6$	$y = 6$	$-3 + y = 6$
$x = -2$		$+3 \quad +3$
		$y = 9$
$(-2, 0)$	$(0, 6)$	$(1, 9)$



b. $7y = 14 - 3x$

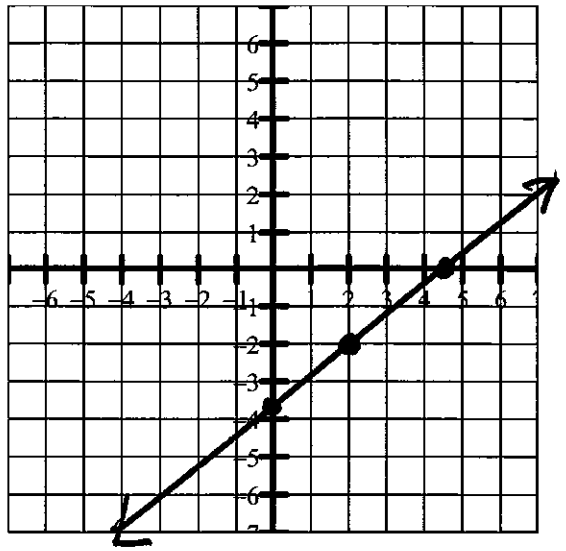
checkpt. $(2, y)$

$(x, 0)$	$(0, y)$	$(2, y)$
$7(0) = 14 - 3x$	$7y = 14 - 3(0)$	$7y = 14 - 3(2)$
$0 = 14 - 3x$	$\frac{7y}{7} = \frac{14}{7}$	$7y = 14 - 6$
$-14 \quad -14$	$y = 2$	$\frac{7y}{7} = \frac{8}{7}$
$\frac{-14}{-3} = \frac{-3x}{-3}$		$y = 1\frac{1}{7}$
$\frac{14}{3} = x$		
$4\frac{2}{3} = x$		
$(4\frac{2}{3}, 0)$	$(0, 2)$	$(2, 1\frac{1}{7})$



c. $4x = 5y + 18$

$(x, 0)$	$(0, y)$	$(2, y)$
~~$4(0) = 5y + 18$~~	$4(0) = 5y + 18$	$4(2) = 5y + 18$
$4x = 5(0) + 18$	$0 = 5y + 18$	$8 = 5y + 18$
	$-18 \quad -18$	$-18 \quad -18$
$\frac{4x}{4} = \frac{18}{4}$	$\frac{-18}{5} = \frac{5y}{5}$	$\frac{-10}{5} = \frac{5y}{5}$
$x = 4\frac{1}{2}$	$-3\frac{3}{5} = y$	$-2 = y$
$(4\frac{1}{2}, 0)$	$(0, -3\frac{3}{5})$	$(2, -2)$



12. Find the x and y-intercepts for the equation $4x - 5y = 0$. Graph the equation. Did you obtain $(0,0)$? To graph the line, you need at least two points. What do you do next to graph the equation? → Need to graph another point, Just like finding a checkpoint

$(x, 0)$	$(0, y)$
$4x - 5(0) = 0$	$4(0) - 5y = 0$
$4x = 0$	$-5y = 0$
$x = 0$	$y = 0$
$(0, 0)$	$(0, 0)$

$(5, \_\_)$

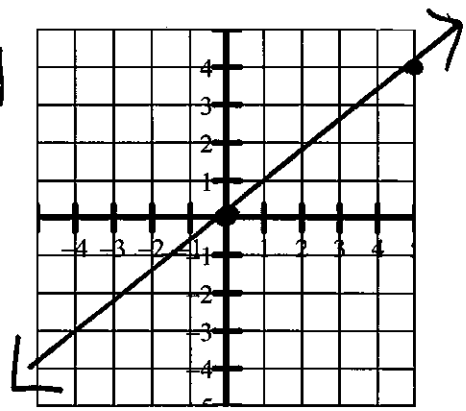
$4(5) - 5y = 0$

$20 - 5y = 0$

$-20 \quad -20$

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

$y = 4 \Rightarrow (5, 4)$



12. Solve the following equations for y:

a. $\frac{2y}{2} = \frac{-x}{2} + \frac{4}{2}$

$y = \frac{-x}{2} + 2$

b. $-6x + 4y = 4$

$+6x \quad +6x$

$\frac{4y}{4} = \frac{4}{4} + \frac{6x}{4}$

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

c. $3x - 2y = 0$

$-3x \quad -3x$

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

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

d. $5y - 2x + 3 = 0$

$+2x - 3 \quad +2x - 3$

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

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

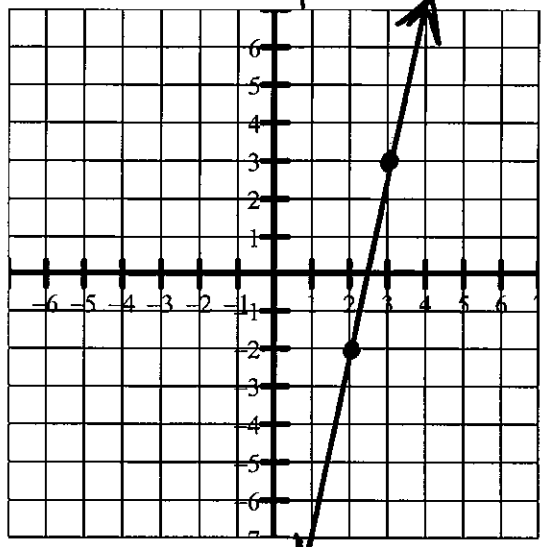
13. Graph the following equations using the alternative method: which means to solve for y and then find 3 points.

a. $y = 5x - 12$

↑ already solved for y, so just find three points:

$(0, \_\_)$	$(2, \_\_)$	$(3, \_\_)$
$y = 5(0) - 12$	$y = 5(2) - 12$	$y = 5(3) - 12$
$= 0 - 12$	$= 10 - 12$	$= 15 - 12$
$= -12$	$= -2$	$= 3$
$(0, -12)$	$(2, -2)$	$(3, 3)$

Oh, this is going to be WAY off the graph.



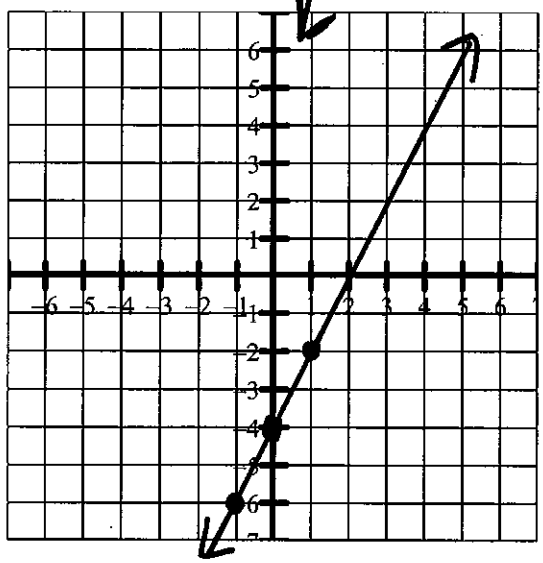
b. $4x - 2y = 8$

$-4x \quad -4x$

$\frac{-2y}{-2} = \frac{8}{-2} - \frac{4x}{-2}$

$y = -4 + 2x$

$(0, \_\_)$	$(1, \_\_)$	$(-1, \_\_)$
$y = -4 + 2(0)$	$y = -4 + 2(1)$	$y = -4 + 2(-1)$
$= -4$	$= -4 + 2$	$= -4 - 2$
	$= -2$	$= -6$
$(0, -4)$	$(1, -2)$	$(-1, -6)$



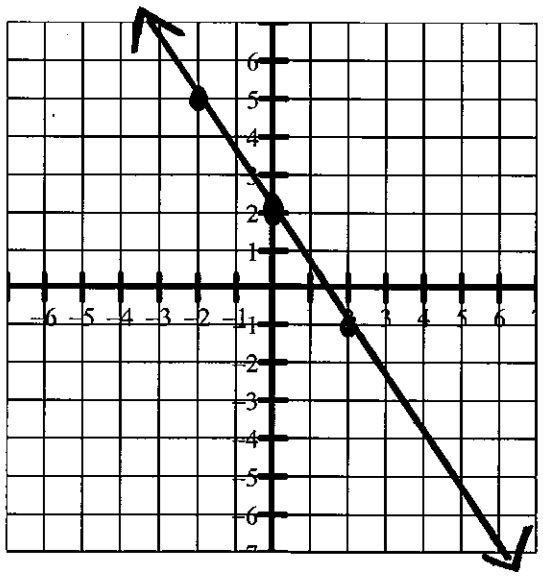
c. $\frac{8}{4} - \frac{6x}{4} = \frac{4y}{4}$

$2 - \frac{6x}{4} = y$

or

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

$(2, -1)$	$(-2, \_\_)$	$(0, \_\_)$
$y = 2 - \frac{3(2)}{2}$	$y = 2 - \frac{3(-2)}{2}$	$y = 2 - \frac{3(0)}{2}$
$= 2 - 3$	$= 2 + 3$	$= 2$
$= -1$	$= 5$	$(0, 2)$
$(2, -1)$	$(-2, 5)$	



14. Graph the following equations:

a. $x+5=0$

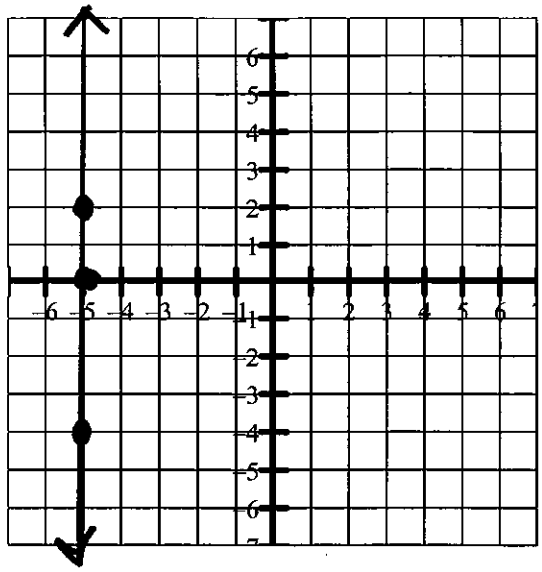
$-5 \quad -5$

$x = -5$ → x is always -5, y can be any number.

(-5, 0)

(-5, 2)

(-5, -4)

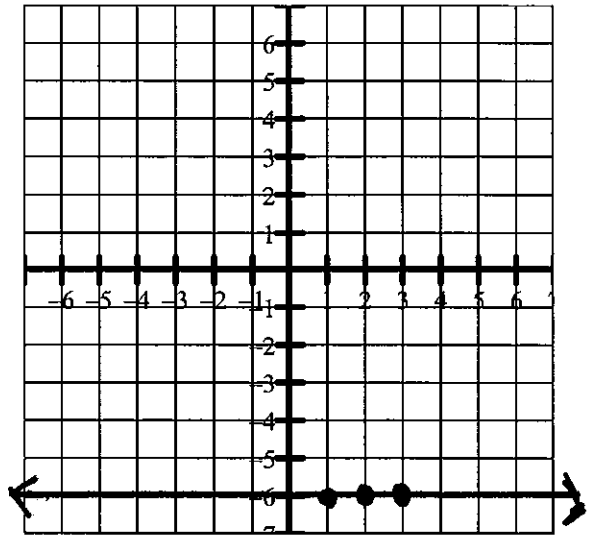


b. $y=-6$ → y is always -6, x can be any #.

(1, -6)

(2, -6)

(3, -6)



To draw, go to the number on the y-axis & draw a horizontal line. The equation will be y = "some number"

c. Explain the pattern of a. and b. That is, how can you recognize the equation of a horizontal line? And how can you recognize the equation of a vertical line?

→ The equation will be x = "some number". To draw, go to the number on the x-axis & draw a vertical line.

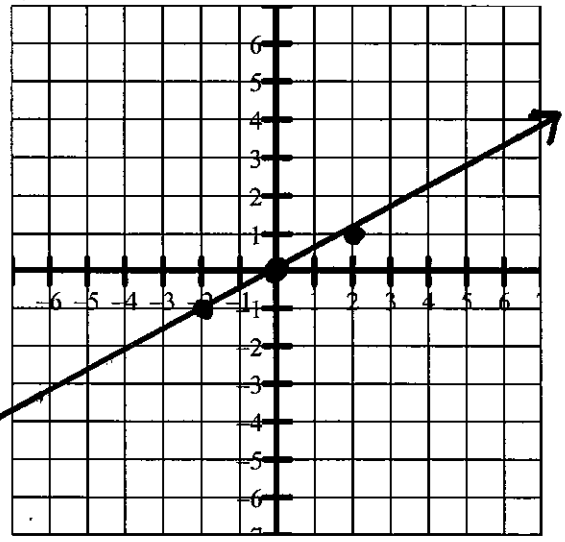
d. $2x-4y=0$

$-2x \quad -2x$

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

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

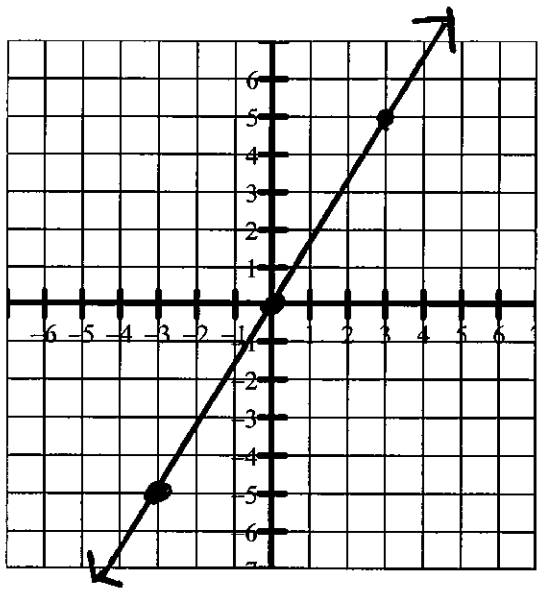
(0, ___)	(2, ___)	(-2, ___)
$y = \frac{0}{2} = 0$	$y = \frac{1(2)}{2}$	$y = \frac{1(-2)}{2}$
(0, 0)	$= \frac{2}{2}$	$= \frac{-2}{2}$
	$= 1$	$= -1$
	(2, 1)	(-2, -1)



e. $\frac{5x}{3} = \frac{3y}{3}$

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

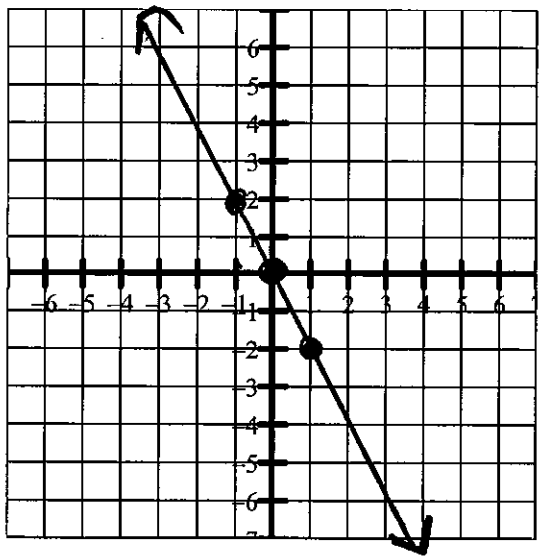
$(0, \_)$	$(3, \_)$	$(-3, \_)$
$y = \frac{5(0)}{3}$	$y = \frac{5(3)}{3}$	$y = \frac{5(-3)}{3}$
$= \frac{0}{3}$	$= \frac{15}{3}$	$= \frac{-15}{3}$
$= 0$	$= 5$	$= -5$
$(0, 0)$	$(3, 5)$	$(-3, -5)$



f. $\frac{6y}{6} = \frac{-12x}{6}$

$y = -2x$

$(0, \_)$	$(1, \_)$	$(-1, \_)$
$y = -2(0)$	$y = -2(1)$	$y = -2(-1)$
$= 0$	$= -2$	$= 2$
$(0, 0)$	$(1, -2)$	$(-1, 2)$



g. Explain the pattern of d., e., and f. What do their graphs have in common? Is there a way to recognize this pattern?

The graphs pass through the origin.

There is no number term, just an x term & y term.

(or the number term is zero)

(d) $2x - 4y = 0$ ↑ # term is zero

(e) $5x = 3y$ ↑ # term is assumed to be zero

(f) $6y = -12x$ ↑ # term is assumed to be zero

Linear Inequalities

15. Determine whether each ordered pair is a solution of $x - y \leq 5$.

a. $(4, 2)$

$4 - 2 \stackrel{?}{\leq} 5$

$2 \leq 5$

True,

$(4,2)$ is a soln.

b. $(0, -6)$

$0 - (-6) \stackrel{?}{\leq} 5$

$6 \leq 5$

False,

$(0,-6)$ is not a soln.

c. $(1, -4)$

$1 - (-4) \stackrel{?}{\leq} 5$

$1 + 4 \leq 5$

$5 \stackrel{?}{\leq} 5$

true, yes

$(1,-4)$ is a soln.

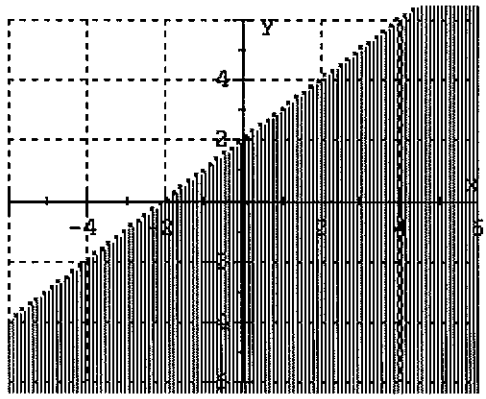
16. The solution to a linear inequality is graphed below. From the graph, determine whether each point is a solution to the inequality.

a. $(0, 2)$ ~ pt. is on the dotted line, so it is not a soln.

b. $(-3, 4)$ ~ is not in the shaded area, so it is not a soln.

c. $(4, -5)$ ~ is in the shaded area, so it is a soln.

d. $(3, 1)$ ~ is in the shaded area, so it is a soln.



17. Complete the graph by shading the correct side of the boundary line.

a. $y - x > -3$

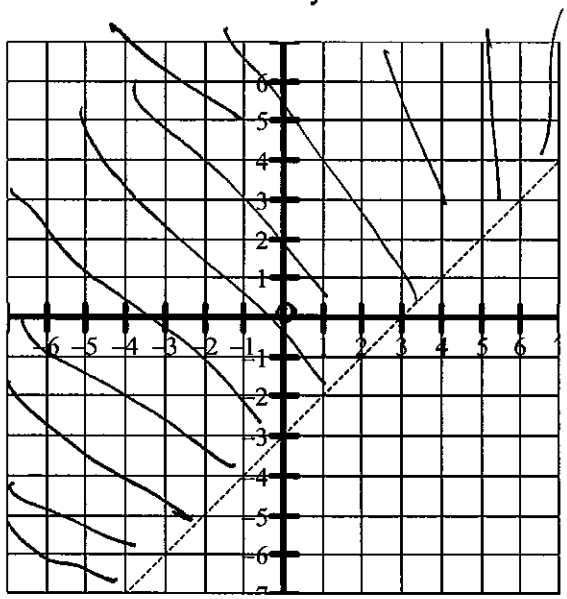
Use the test point (0,0):

$0 - 0 > -3$

$0 > -3$

True

So we shade the side that contains (0,0).



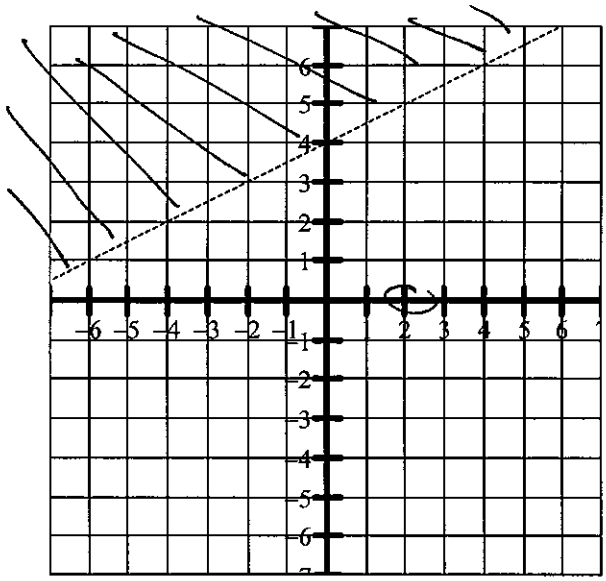
b. $-x + 2y > 8$

Use the test pt (2,0):

$-2 + 2(0) > 8$

$-2 > 8$

False so shade the side opposite of the area that contains (2,0).



c. $9x + y \geq 3$

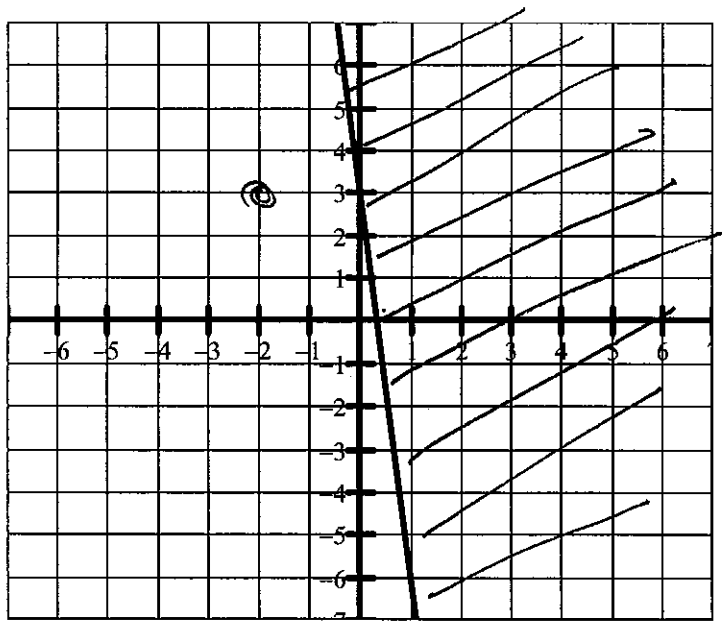
Use the test point (-2,3):

$9(-2) + 3 \geqslant 3$

$-18 + 3$

$-15 \geqslant 3$

False so shade the side opposite that contains the point (-2,3).



Graph each inequality:

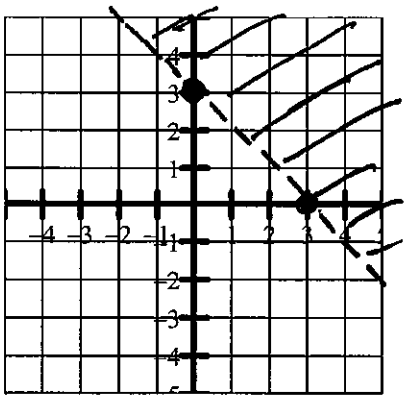
18. $x + y > 3$

Boundary Line: $x + y = 3$

(0,3) & (3,0)

Test pt: (0,0) : $0 + 0 > 3$

$0 > 3$ No.



b. $3x - 4y < 12$

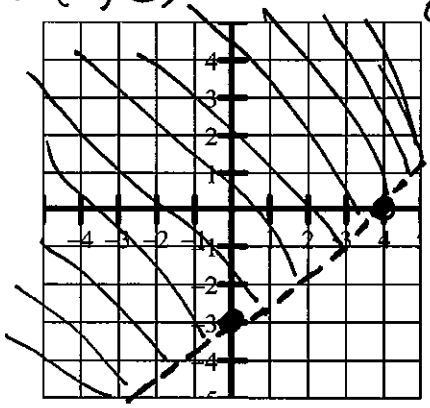
Boundary Line: $3x - 4y = 12$

(4, 0) & (0, -3)

Test point (0,0): $3(0) - 4(0) < 12$

$0 < 12$

true



c. $y - x \leq 0$

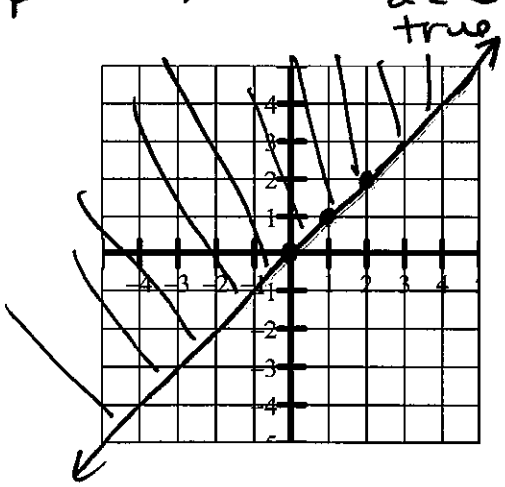
Boundary Line: $y - x = 0$

(0, 0) (1, 1)

Test pt: (0,2): $0 - 2 \leq 0$

$-2 \leq 0$

true



d. $2x - y > 2$

Boundary Line: $2x - y = 2$

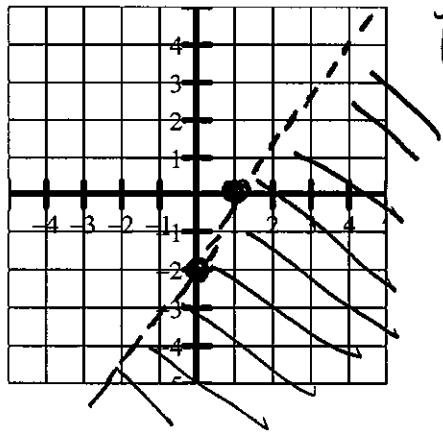
(1, 0) & (0, -2)

Test point: (-1, 1): $2(-1) - 1 > 2$

$-2 - 1 > 2$

$-3 > 2$

No, false



e. $x < 2$

Boundary Line: $x = 2$

Vertical line thru 2 on the x-axis.

Test pt:

(4, 3)

$4 < 2$