6.5 Linear Inequalities

* A solution of an inequality is an ordered pair that makes the inequality true.

* A linear inequality in two variables has an infinite number of solutions. (represented on the coordinate plane as the set of all points on one side of a boundary line.

Review Linear equations

* what type of line will this equation form when graphed?

(A) $y = 2x + 4$ (diagonal line)

(B) $y = 7$ (horizontal line)

(C) $x = -3$ (Vertical line)

* Review Problem 1 "Identifying Solutions of a Linear Inequality" on pg. 394

* Got it # 1a) $y \le \frac{2}{3}x + 4$

$6 \le \frac{2}{3}(3) + 4$

$6 \le 2 + 4$

$6 \le 6$ ✓ TRUE

1b) No, it could be on the line $y = x + 10$

* When $y = -2x + 5$ is graphed on a coordinate plane, the equation separates the coordinate plane into 3 sets:

1) points on the line (boundary line)
2) points above the line (half plane)
3) points ~~above~~ below the line (half plane)

* To graph inequalities on a coordinate plane:
  1) Rewrite the inequality into slope-intercept form
  2) graph your boundary line

     $\leq$ or $\geq$ solid line
     $<$ or $>$ dashed line

  3) Test a point on one side of your boundary line

  4) shade the half-plane that makes the inequality true
     * if y is solved for then $<$ or $\leq$ shade below the boundary line, $>$ or $\geq$ shade above it

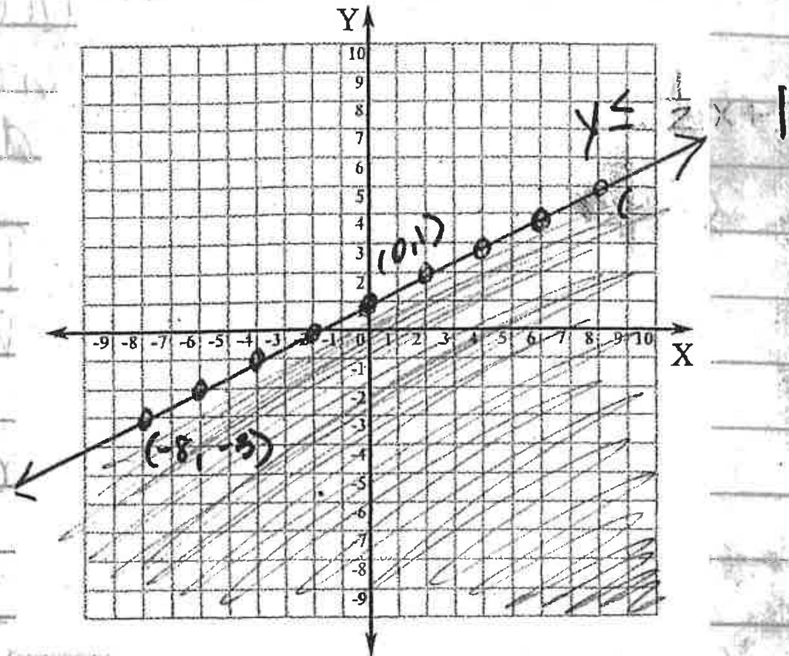
* The boundary line is the "boundary" between true & false values of the inequality

* Review Problem 2 "Graphing an Inequality in Two Variables" on pg. 395

Got it #2

* $y \le \frac{1}{2}x + 1$

Solid Line



* Test (0, 0)

$y \le \frac{1}{2}x + 1$

$0 \le \frac{1}{2}(0) + 1$

$0 \le 1$

TRUE

* Test (1,3)

$y \le \frac{1}{2}x + 1$

$3 \le \frac{1}{2}(1) + 1$

$3 \le 1\frac{1}{2} + 1$

$3 \le 2\frac{1}{2}$

False

* Review Problem 3 "Graphing a Linear Inequality in One Variable" on pg. 395

* Review Problem 4 "Rewriting to Graph an Inequality" on pg. 396

Got it? 4)

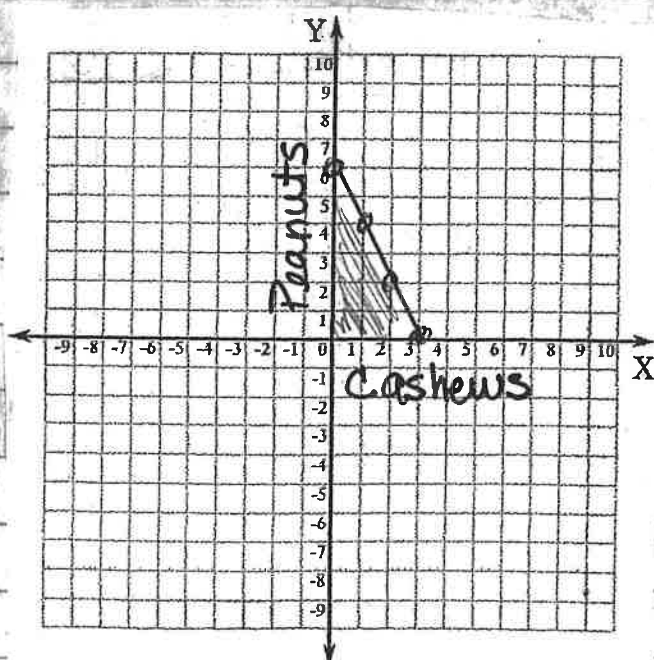
$$12 \ge 2p + 4c$$
$$-4c \qquad -4c$$
$$\frac{12 - 4c \ge 2p}{2}$$
$$6 - 2c \ge p$$
$$p \le -2c + 6$$

$$12 \ge 2p + 4c$$
$$-2p \quad -2p$$
$$\frac{12 - 2p \ge 4c}{4}$$
$$3 - \frac{1}{2}p \ge c$$

Possible answers: 3lbs. of cashews &
0lbs. of peanuts

0lbs. of cashews &
6lbs. of peanuts

2lb. of each



* Review Problem 5 "Writing an Inequality From a graph" on pg. 397

* Got it? #5 $y > \frac{1}{3}x - 2$

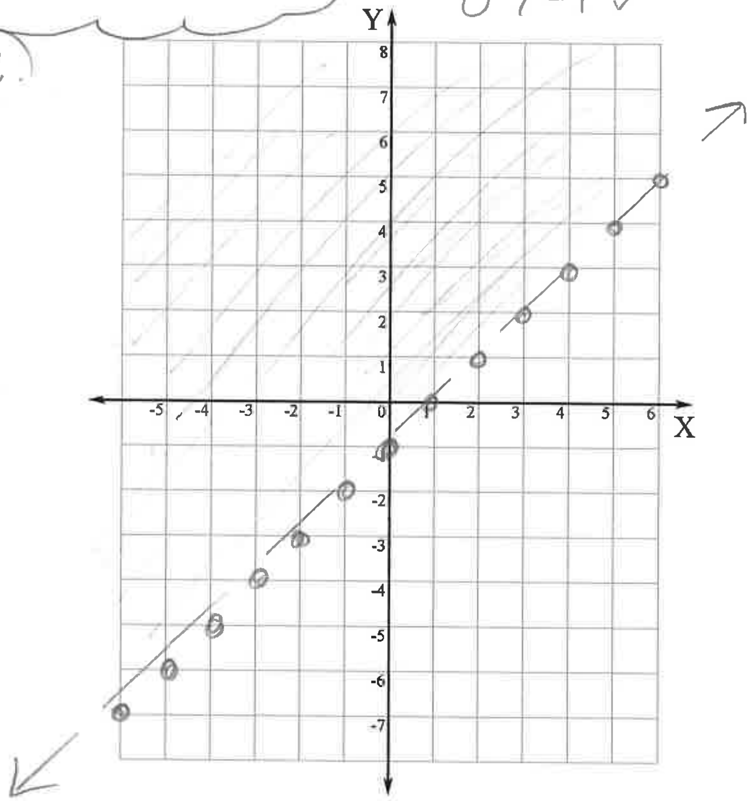
4 additional

examples

$y > x - 1$
Dotted line

Test (0,0)
$0 > 0 - 1$
$0 > -1$ ✓

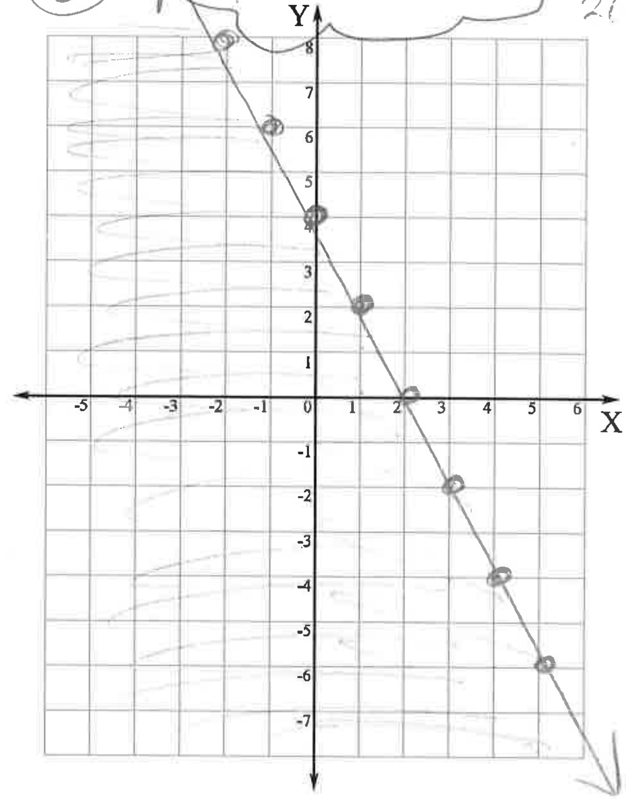
C.

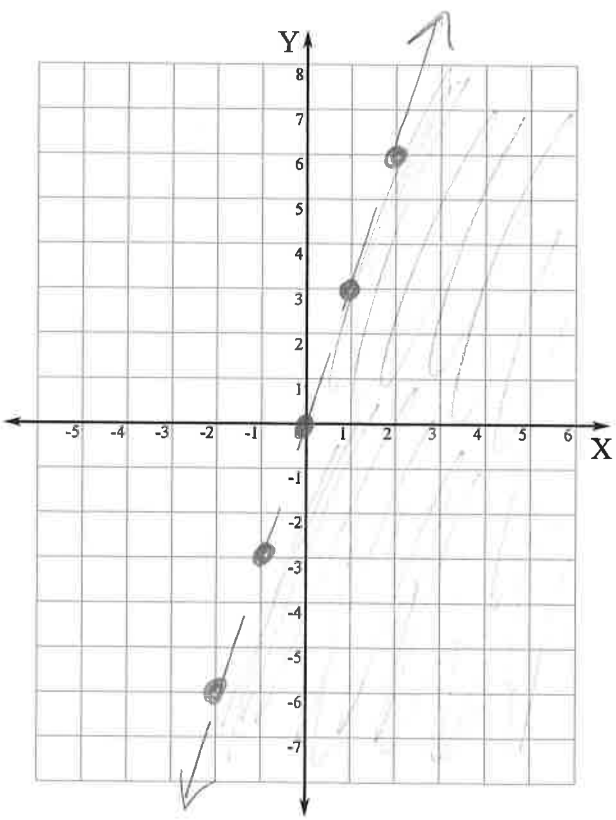


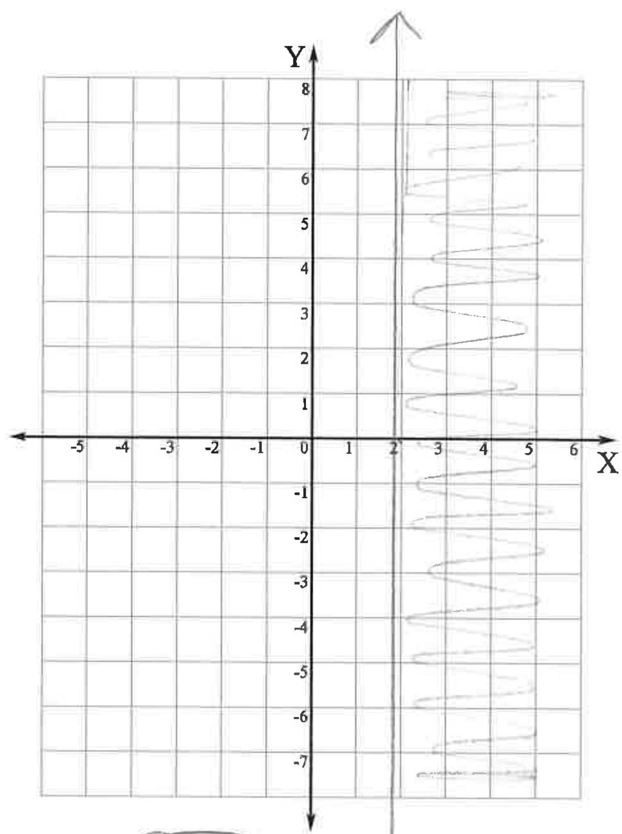
$2x + y \le 4$
$-2x \quad\quad -2x$
$y \le -2x + 4$

D

TEST
(0,0)
$2(0) + 0 \le 4$
$0 \le 4$
✓







E

$y - 3x < 0$
$+3x \quad +3x$
$y < 3x$

Test (1,1)
$1 - 3(1) < 0$
$1 - 3 < 0$
$-2 < 0$ ✓

F

$x \ge 2$

TheMathWorksheetSite.com

TEST (0,0)
$0 \ge 2$
NO

1 Sheet of 4Q

6.5 pg. 397 #5, 6-28 even #32-34 all 37, 38 & 41

6) below $<$ or $\le$ is below (less)
$>$ or $\ge$ above (greater)

5) same => answers are ordered pairs

different => linear equation is a line
linear inequality is a region of the coordinate plane

8) $y \le -2x+1$
$2 \le -2(2)+1$
$2 \le -4+1$
$2 \le -3$
False

10) $y \ge 3x-2$
$0 \ge 3(0)-2$
$0 \ge -2$
TRUE

12) $y \ge -\frac{2}{5}x+4$
$0 \ge -\frac{2}{5}(0)+4$
$0 \ge 4$
False

14) -28) See graph paper

32) $y \ge -3x+3$

33) $y > \frac{3}{2}x-3$

34) $x < 3$

*See graph - easier way to graph (rewrite to slope-intercept & find 2 intercepts)

36) a) $10x + 8y \ge 800$

Rewrite

$\frac{8y \ge -10x+800}{8}$

$y \ge -\frac{5}{4}x+100$

X = cafe
Y = market

x	y
0	100
80	0

=>

(b) $10x + 8y \geq 800$

$10(x) + 8(60) \geq 800$ (32, 60)

$10x + 480 \geq 800$

$\frac{10x \geq 320}{10}$

$x \geq 32$

* Yes, the Student can earn @ least $800 each month.

* The graph proves this b/c (60, 90) is part of the shaded region.

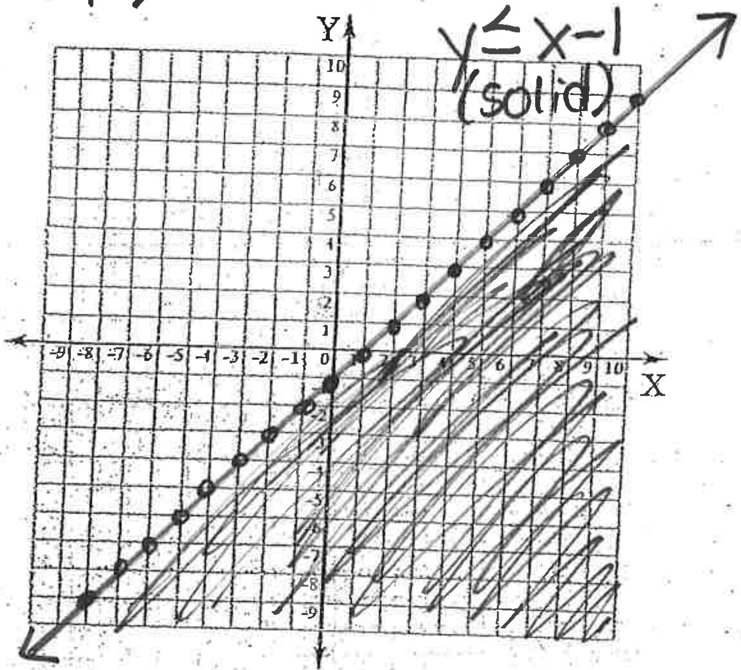
37) * Other side should be Shaded

38) Not if the boundary line falls on (0,0)

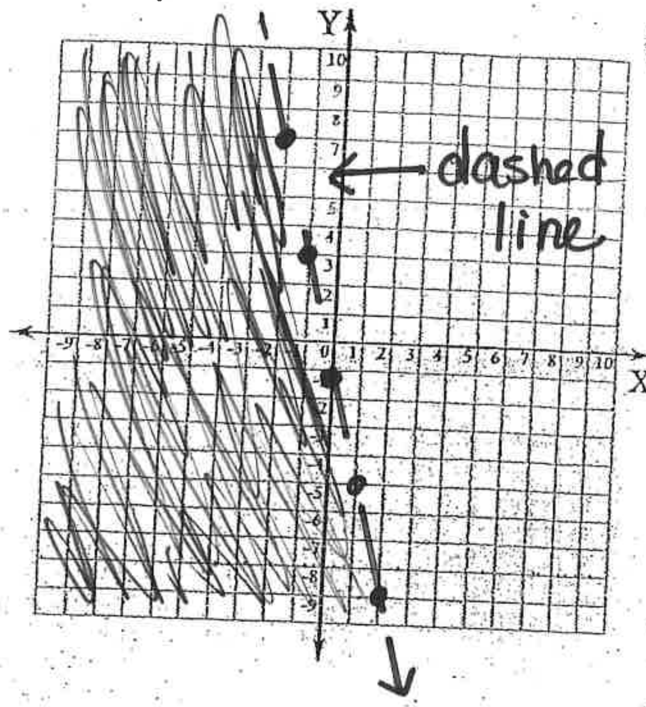
41) $y > mx + b$ = See graph

Negative

14) $y \leq x-1$ (solid)

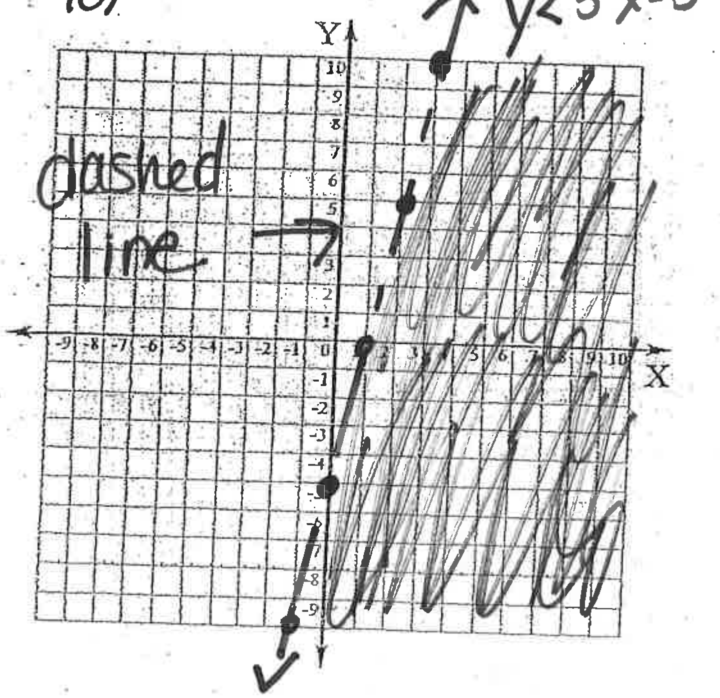


16) $y < -4x-1$



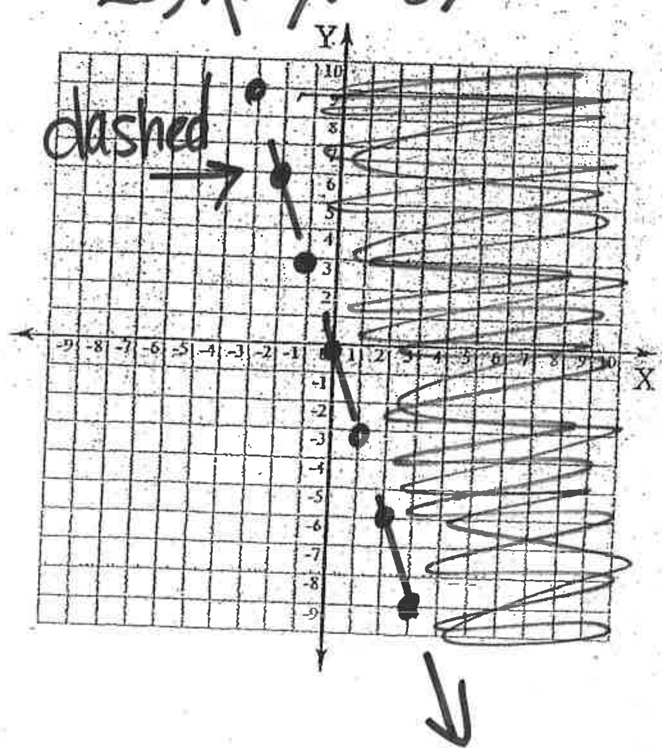
dashed line

18) $y < 5x-5$



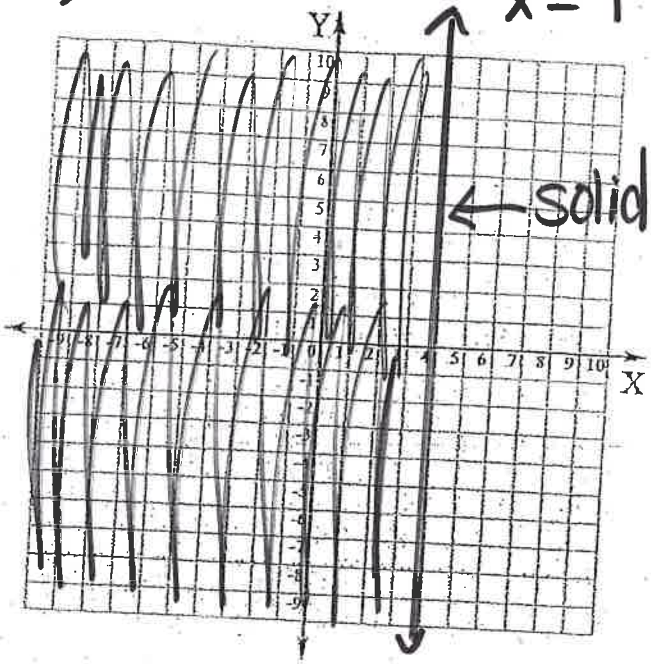
dashed line

20) $y > -3x$

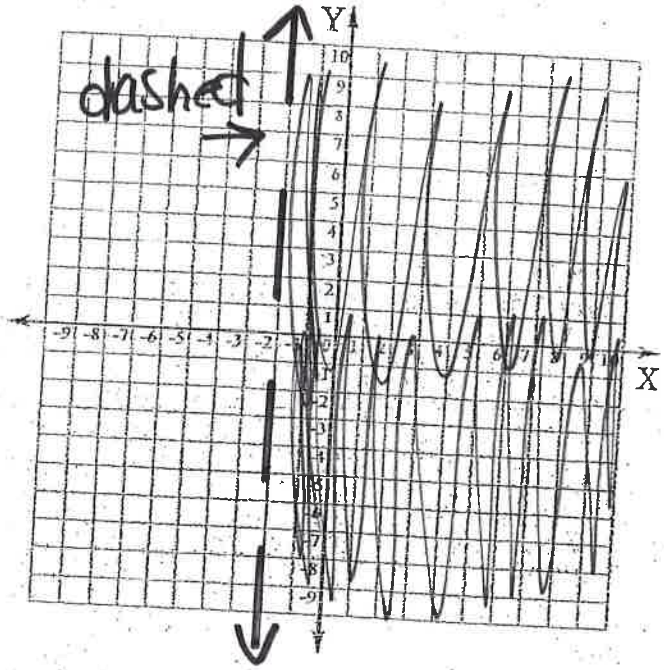


dashed

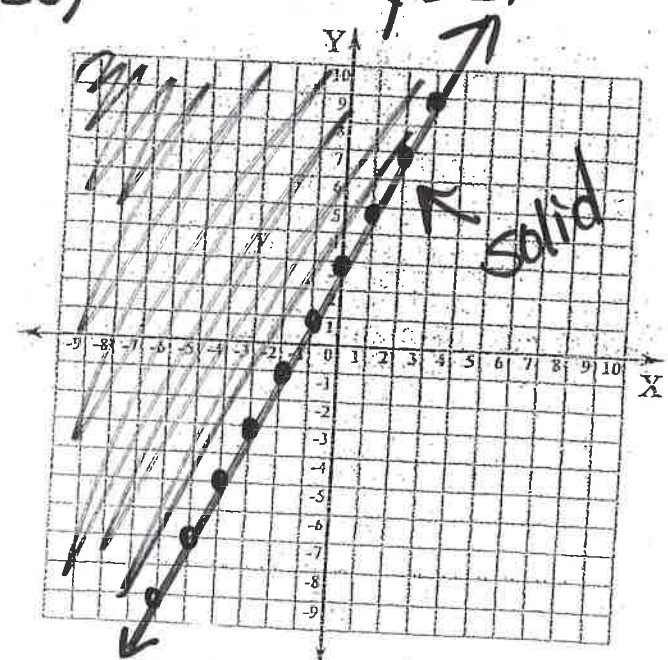
22) $x \leq 4$



24) $x > -2$

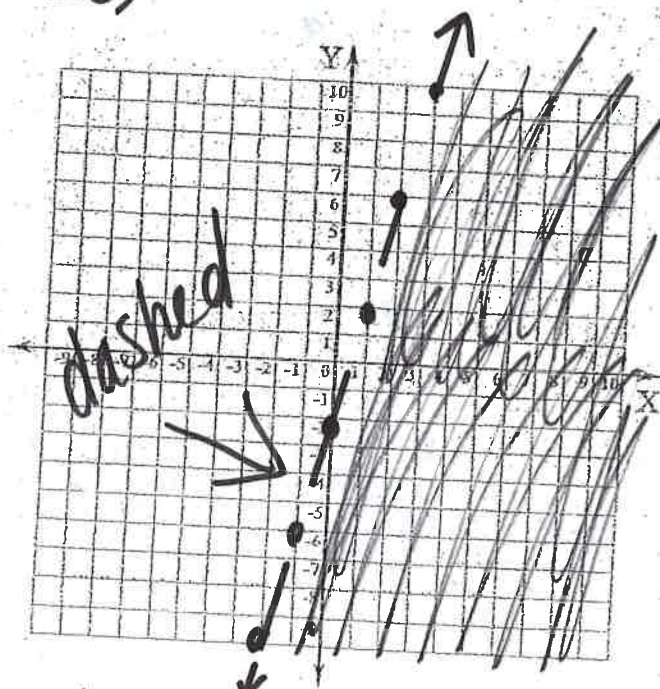


26) $y \geq 2x+3$



$$-2x + y \geq 3$$
$$+2x \qquad\qquad +2x$$
$$y \geq 2x+3$$

28)



$$4x - y > 2$$
$$-4x \qquad\qquad -4x$$

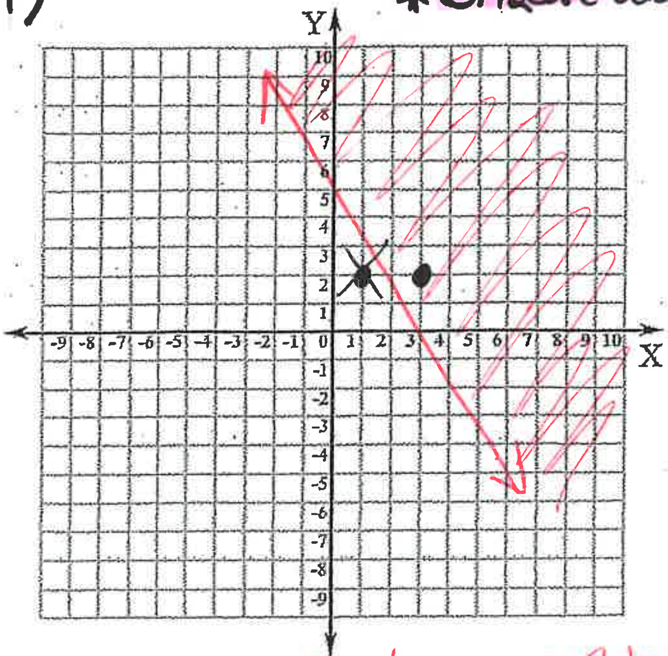
FLIP **

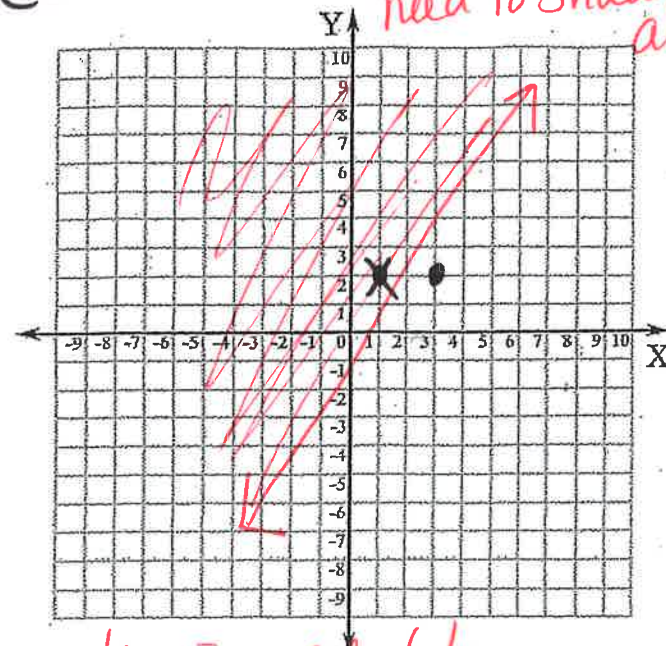
$$-1(-y > -4x + 2)$$
$$y < 4x + -2$$

4) $y > mx + b$

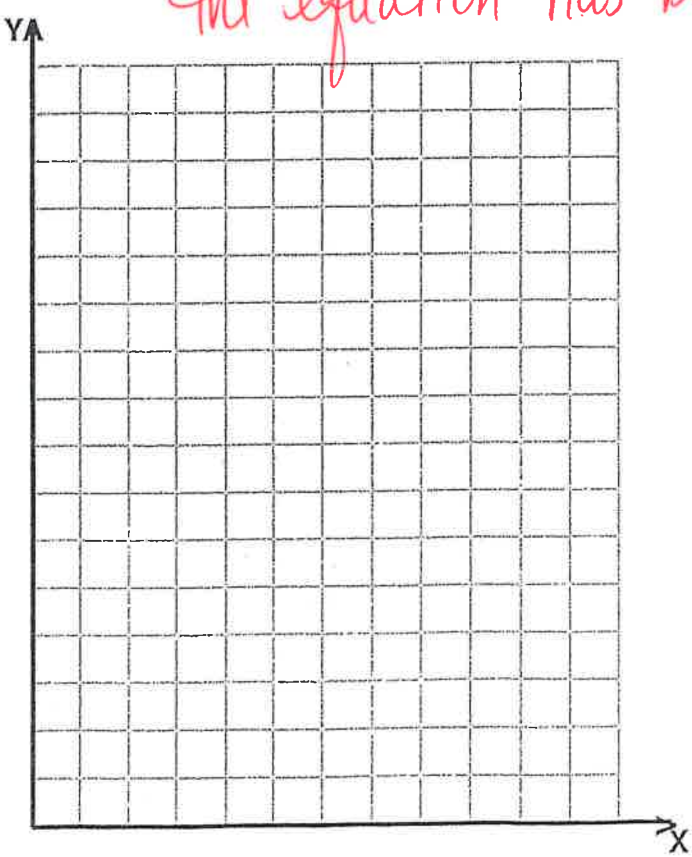
*shade above

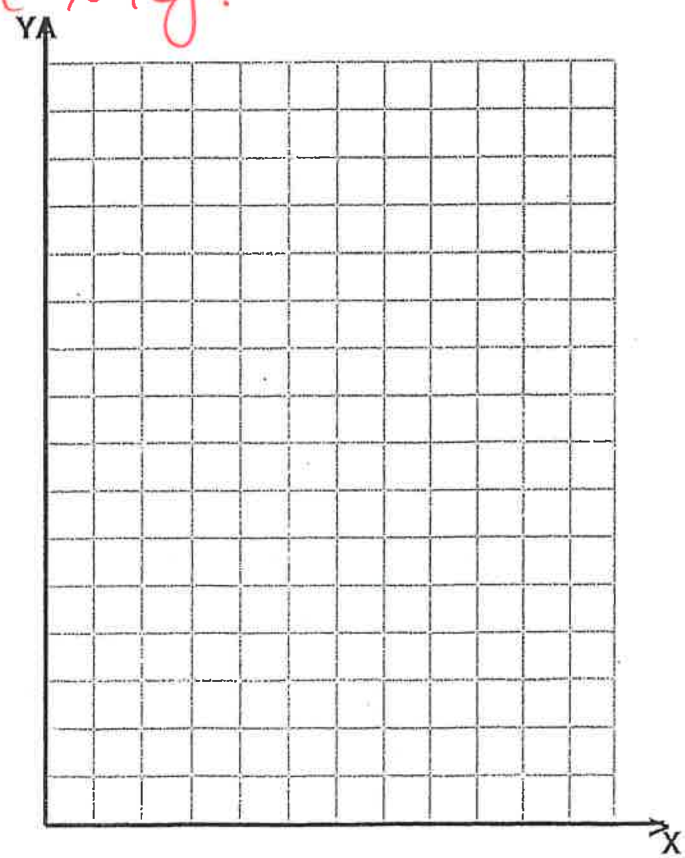
*cannot be a positive line b/c you need to shade above

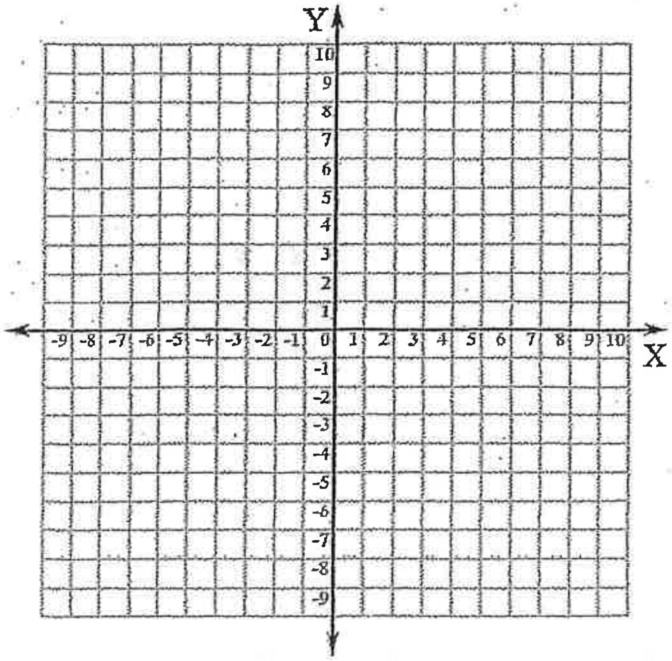


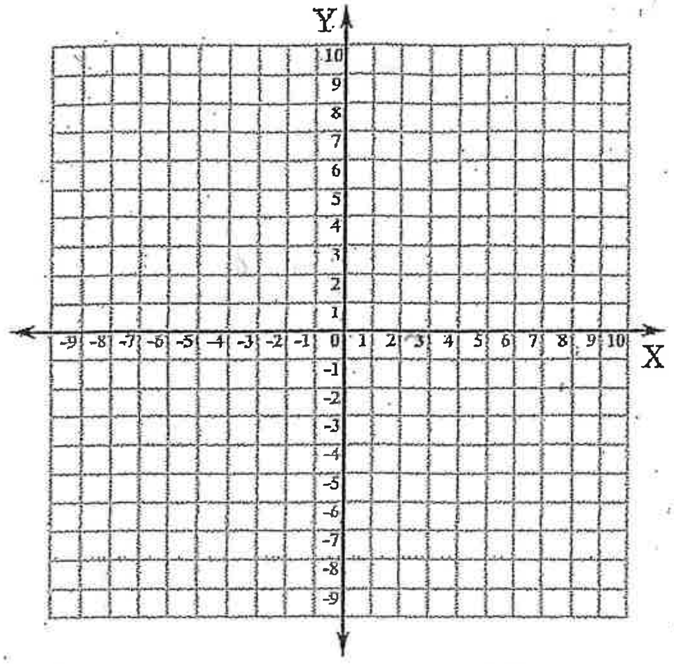


*cannot be vertical or horizonal b/c the equation has both x & y.

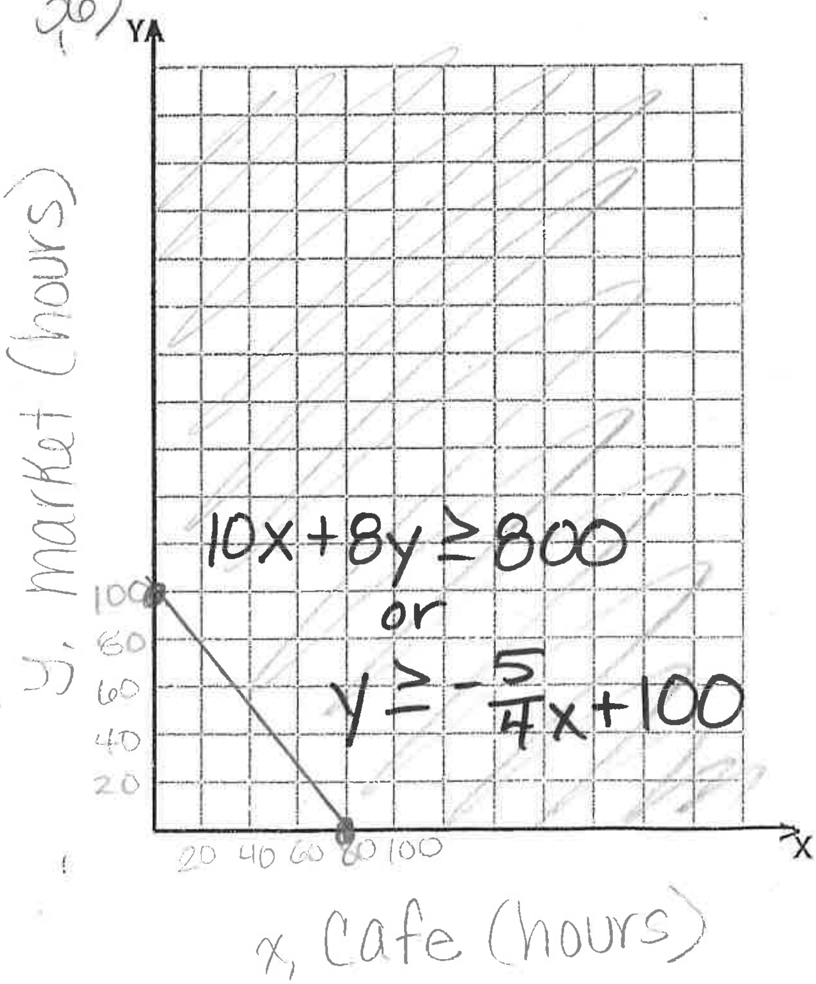








36)



$10x + 8y \geq 800$

or

$y \geq -\frac{5}{4}x + 100$