Name: Key

Algebra 1

End-of-Unit 2 Study Guide

Linear Equations, Inequalities, and Systems

Below is a list of topics you will need to understand in order to prepare for your unit exam:

- Solve linear inequalities in one variable
  - Identify solutions
  - Use algebra to find all possible solutions to a linear inequality
- Graph a linear inequality in two variables
  - Which type of line (dashed or solid)? ≥ or ≤ use solid; > or < use dashed
  - Where should you shade?
- Create a linear equation or inequality from a real-life situation
- Graph the solution(s) to a system of linear inequalities in two variables
- Identify the solution(s) to a system of linear inequalities in two variables
- Create a system of linear inequalities from a real-life situation
  - Graph the system
  - Identify solutions to the situation

remember when you multiply or divide by a negative, you flip the inequality

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Practice Problems

1. Solve each inequality.

a. $12 < \frac{x}{5} - 10$

a) $12 < \frac{x}{5} - 10$
$+10 \quad +10$
$5 \cdot 22 < \frac{x}{5} \cdot 5$
$110 < x$
$x > 110$

b. $22 - 6x \geq 4$

b) $\frac{22}{-22} - 6x \geq \frac{4}{-22}$
$\frac{-6x}{-6} \leq \frac{-18}{-6}$
$x \leq 3$

c. $2x - 5 \leq 4x - 13$

c) $2x - 5 \leq 4x - 13$
$-2x \quad -2x$
$-5 \leq 2x - 13$
$+13 \quad +13$
$\frac{8}{2} \leq \frac{2x}{2}$
$4 \leq x$
$x \geq 4$

d. $\frac{x-48}{6} \geq \frac{x}{2} - 4$

see next page

2. Select **all** the ordered pairs which are solutions to the inequality $4x + 8y \leq -8$.

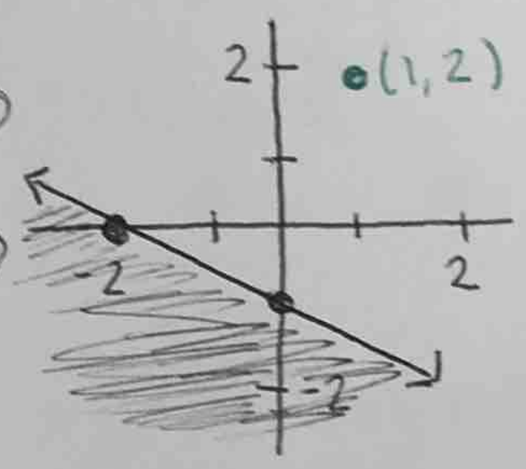
solutions can be plugged in to see if it makes it true or check to see if it's in the shaded region of the graph

~~a.~~ (1,2)

b. (−6,0)

c. (6,−4)

~~d.~~ (−7,5)



a) $4(1) + 8(2) \stackrel{?}{\leq} -8$
$4 + 16 \leq -8$
$20 \not\leq -8$

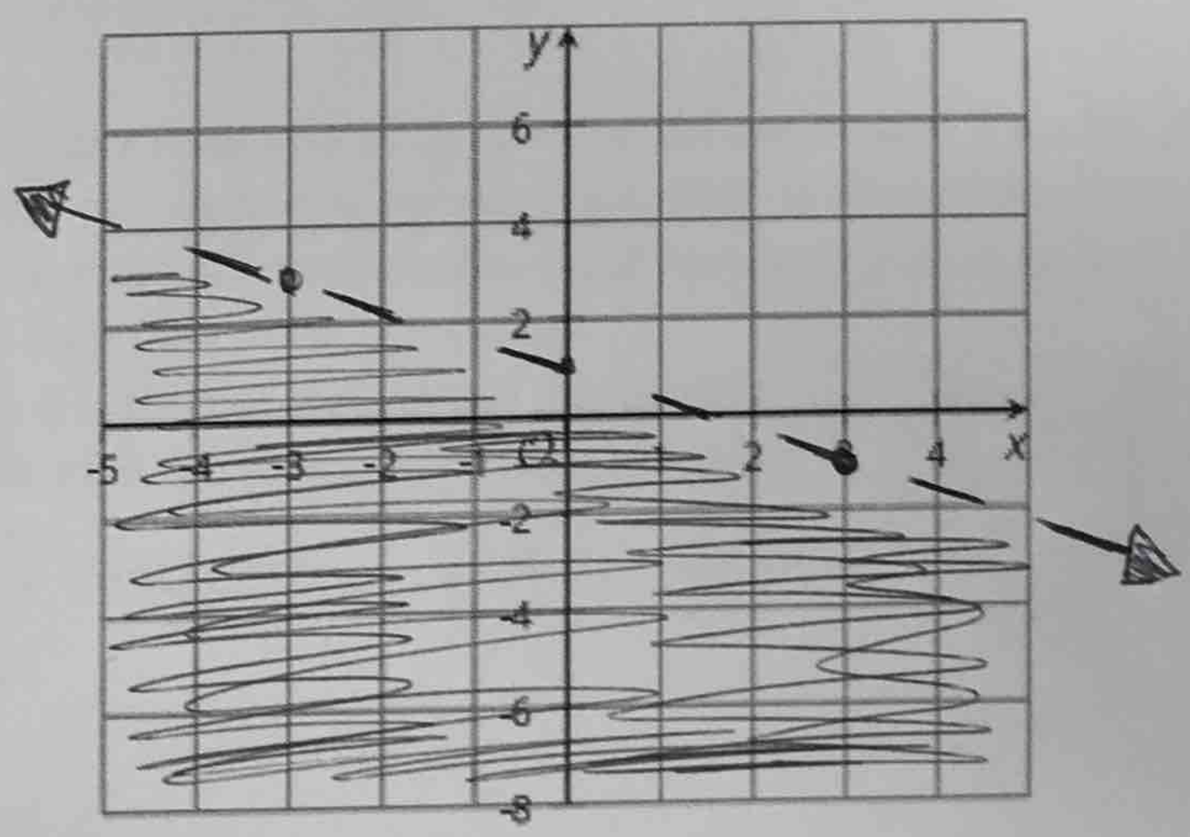
b) $4(-6) + 8(0) \stackrel{?}{\leq} -8$
$-24 + 0 \leq -8$ ✓

c) $4(6) + 8(-4) \stackrel{?}{\leq} -8$
$24 + -32 \leq -8$
$-8 \leq -8$ ✓

d) $4(-7) + 8(5) \stackrel{?}{\leq} -8$
$-28 + 40 \leq -8$
$12 \not\leq -8$

3. Graph the inequality $y < \frac{-2}{3}x + 1$

↳ dashed



d) $6 \cdot \left(\frac{x-48}{6}\right) \geq \left(\frac{x}{2} - 4\right) 6$

$x - 48 \geq \frac{36x}{2} - 24$

$x - 48 \geq 3x - 24$

$-x \quad\quad -x$

$-48 \geq 2x - 24$

$+24 \quad\quad +24$

$\frac{-24}{2} \geq \frac{2x}{2}$

$-12 \geq x$

$x \leq -12$

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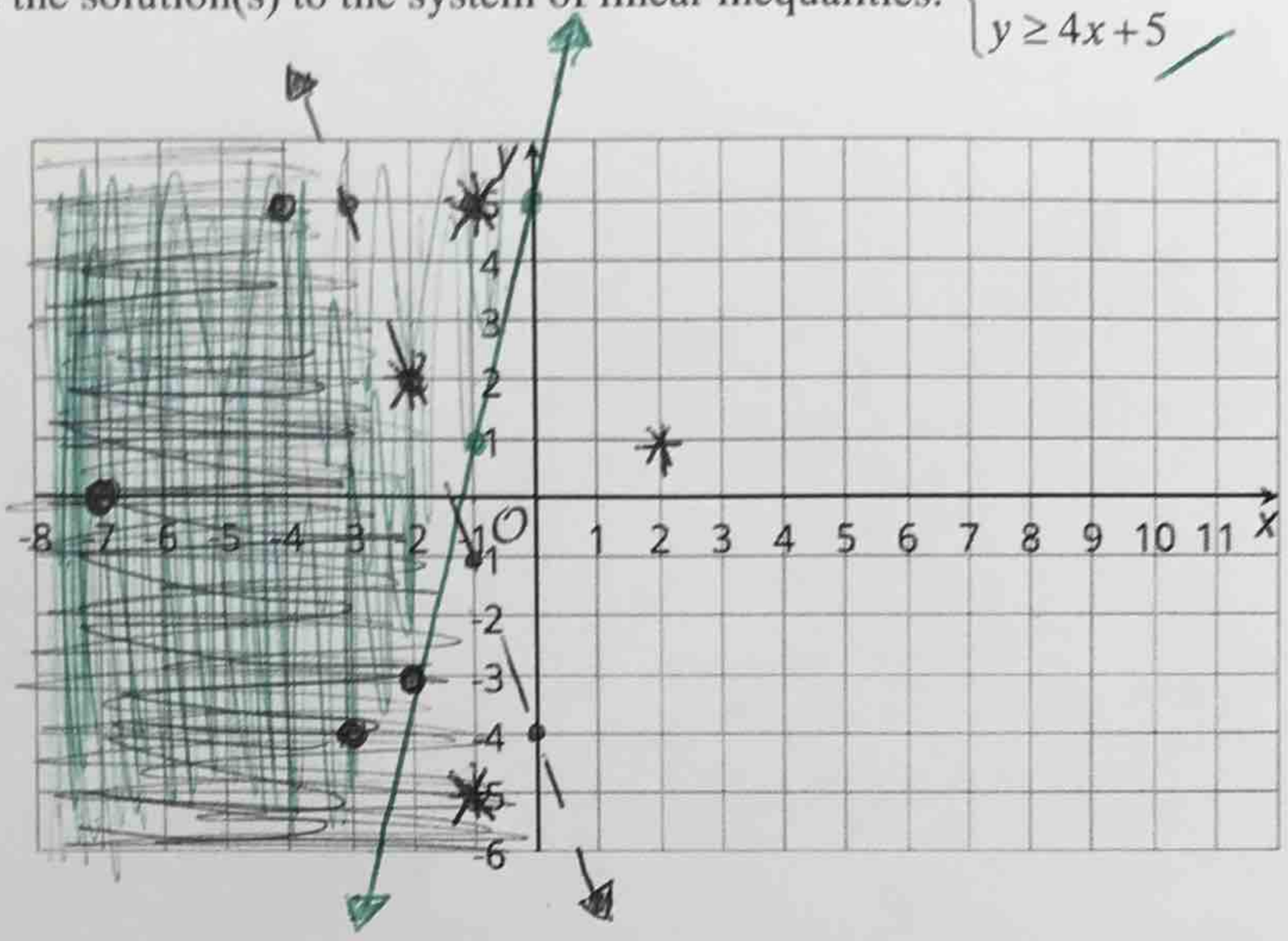
4. Graph the solution(s) to the system of linear inequalities: $\begin{cases} y < -3x - 4 \\ y \geq 4x + 5 \end{cases}$



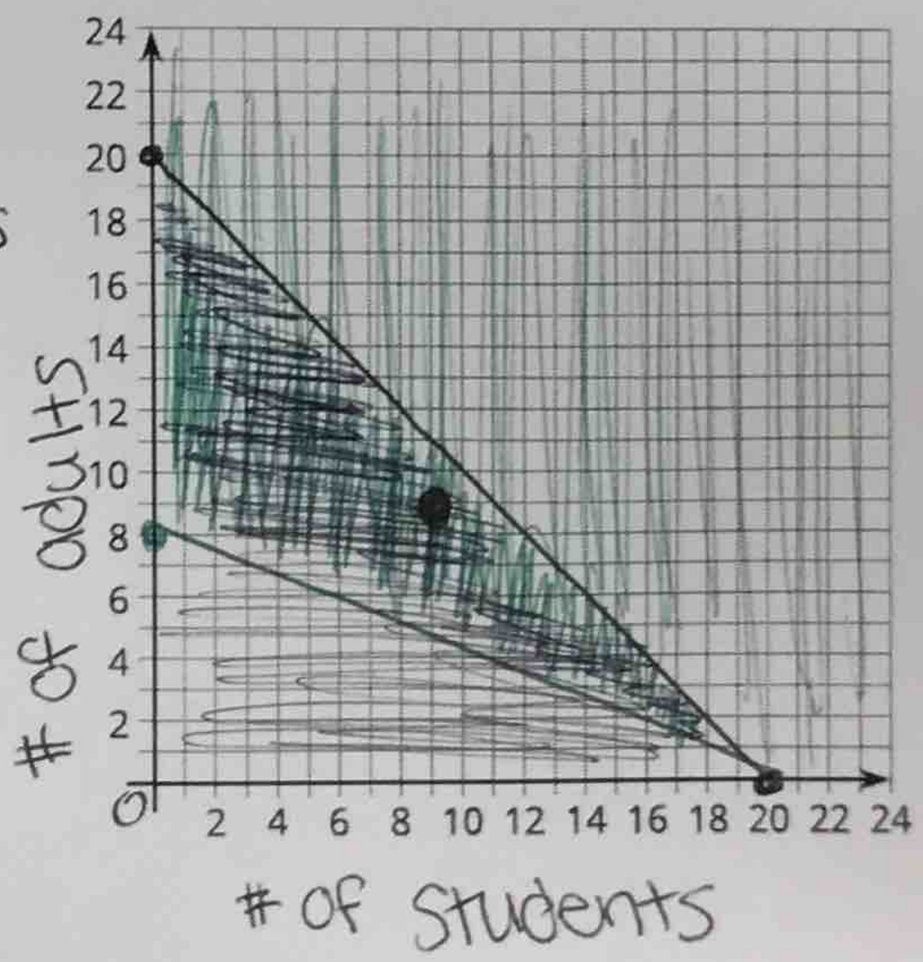
- List 2 solutions to the system.
(any point in the double-shaded region)
(-7,0), (-3,-4) (-4,5) (-2,-3)

* List 2 non-solutions to the system. any point in the ~~sing~~single shaded ~~&~~ non-shaded region
(-1,5) (-2,2) (-1,-5) (2,1)

5. The Central Drama Club is hosting an event to raise money. The club charges $10 per student and $25 per adult to attend the event. Each session of the event can hold a maximum of 20 people and the club has calculated that they need to raise at least $200 per session in order to meet their goal.

   a. Create a system of inequalities that models the situation. Be sure to define the variables you use.
   x=# of students y=# of adults
   $10x+25y \geq 200$
   $x+y \leq 20$

   b. Graph the system on the grid below. Label the axes and identify one possible solution.
   (9,9)
   9 students & 9 adults



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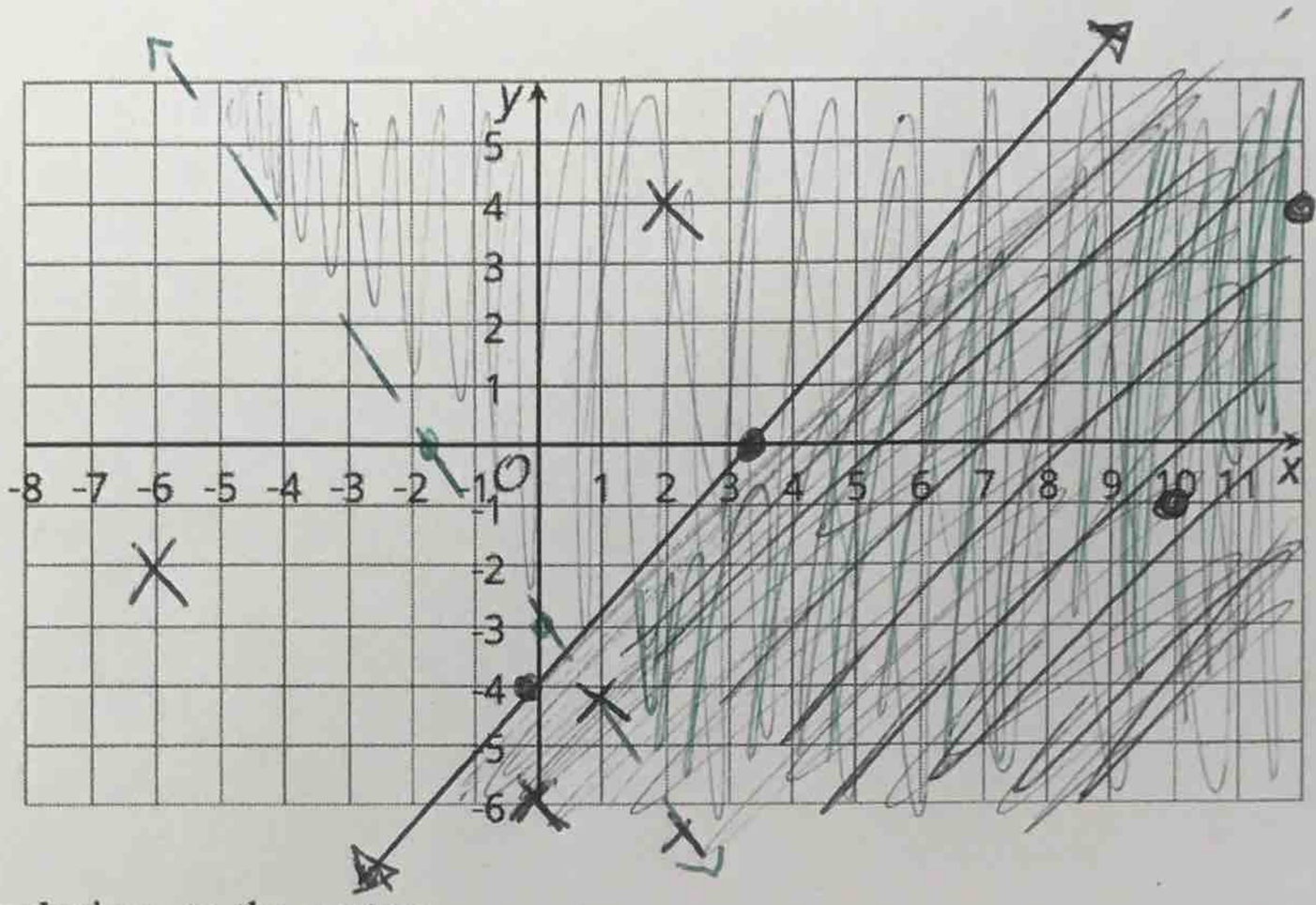
6. Graph the solution(s) to the system of linear inequalities: $\begin{cases} -6x+5y \le -20 \\ 7x+4y > -12 \end{cases}$



• List 2 solutions to the system.

(12, 4)

(10, -1)

(3.$\overline{33}$, 0)

X List 2 non-solutions to the system.

(2, -6.5)

(2, 4)

(0, -6)

(-6, -2)