

Review for Unit 1 Test: Systems and Inequalities

Solve each system by elimination.

$$\begin{aligned} 1) \quad & -2x - 3y = -5 \xrightarrow{-2} +4x + 6y = 10 \\ & -4x - 5y = -7 \xrightarrow{-2} -4x - 5y = -7 \end{aligned}$$

$$\begin{aligned} & -4x - 5(3) = -7 \qquad y = 3 \\ & -4x - 15 = -7 \end{aligned}$$

$$\begin{aligned} & -4x - 15 = -7 \\ & \quad +15 \quad +15 \\ \hline & -4x = 8 \end{aligned}$$

$$\begin{aligned} & \frac{-4x}{-4} = \frac{8}{-4} \\ & x = -2 \end{aligned}$$

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

$$\begin{aligned} 3) \quad & 4x - y = -1 \xrightarrow{x=-2} -8x + 2y = 2 \\ & 8x - 8y = 16 \xrightarrow{-2} 8x - 8y = 16 \end{aligned}$$

$$8x - 8(-3) = 16$$

$$\begin{aligned} 8x + 24 &= 16 \\ -24 & \quad -24 \\ \hline 8x &= -8 \end{aligned}$$

$$\begin{aligned} \frac{8x}{8} &= \frac{-8}{8} \\ x &= -1 \end{aligned}$$

$$\begin{aligned} -6y &= 18 \\ \frac{-6y}{-6} &= \frac{18}{-6} \\ y &= -3 \end{aligned}$$

$$x = -1 \quad \boxed{(-1, -3)}$$

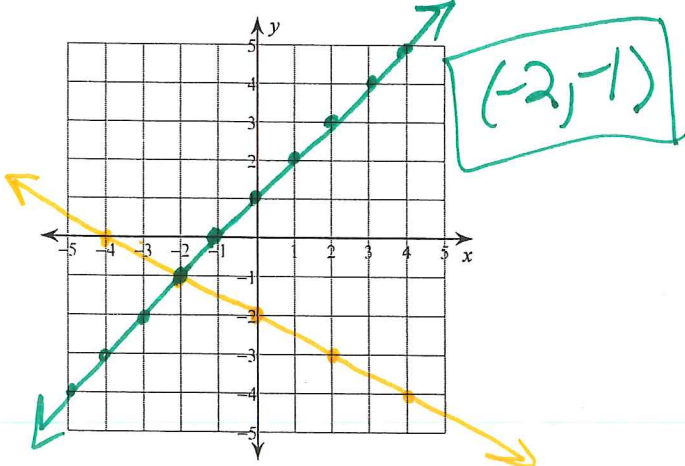
$$\begin{aligned} 2) \quad & -8x + 4y = -12 \xrightarrow{2} -8x + 4y = -12 \\ & 4x - 2y = 6 \xrightarrow{2} 8x - 4y = 12 \end{aligned}$$

$$0 = 0$$

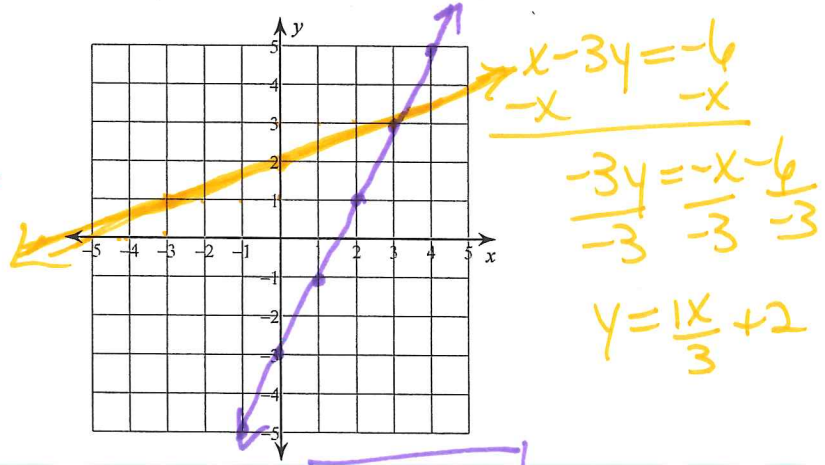
infinitely many solutions

Solve each system by graphing.

$$\begin{aligned} 4) \quad & y = -\frac{1}{2}x - 2 \\ & y = x + 1 \end{aligned}$$



$$\begin{aligned} 5) \quad & 2x - y = 3 \xrightarrow{-2x} -y = -2x + 3 \\ & x - 3y = -6 \xrightarrow{-2x} -x - 6y = -12 \end{aligned}$$



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

Solve each system by substitution.

6) $3x + 2y = -6$
 $x + y = -2$
 $-x \quad -x$

$$y = -x - 2$$

$$y = 2 - 2 = 0$$

$$y = 0$$

$$3x + 2(-x - 2) = -6$$

$$3x - 2x - 4 = -6$$

$$x - 4 = -6$$

$$+4 \quad +4$$

$$x = -2$$

$$(-2, 0)$$

7) $x - 4y = 4$
 $2x - 8y = 7$

$$x = 4y + 4$$

$$2(4y + 4) - 8y = 7$$

$$8y + 8 - 8y = 7$$

$$8 \neq 7 ???$$

$$\text{NO Solution}$$

8) $-2x - 8y = 8$
 $4x + y = 14$
 $-4x \quad -4x$

$$y = -4x + 14$$

$$y = -4(4) + 14 = -2$$

$$y = -2$$

$$-2x - 8(-4x + 14) = 8$$

$$-2x + 32x - 112 = 8$$

$$30x = 120$$

$$\frac{30x}{30} = \frac{120}{30}$$

$$x = 4$$

$$(4, -2)$$

9) The sum of two numbers is 20. Their difference is 6. Find the numbers.

$$x + y = 20$$

$$x - y = 6$$

$$2x = 26$$

$$x = 13 \quad y = 7$$

10) Find the value of two numbers if their sum is 26 and their difference is 2.

$$x + y = 26$$

$$x - y = 2$$

$$2x = 28$$

$$x = 14 \quad y = 12$$

11) The school that Ashley goes to is selling tickets to a fall musical. On the first day of ticket sales the school sold 6 adult tickets and 3 child tickets for a total of \$126. The school took in \$238 on the second day by selling 12 adult tickets and 5 child tickets. Find the price of an adult ticket and the price of a child ticket.

$$x: \text{adult} = 14$$

$$y: \text{child} = 14$$

$$6x + 3y = 126 \rightarrow -12x - 6y = -252$$

$$12x + 5y = 238 \rightarrow \underline{12x + 5y = 238}$$

$$-y = 14$$

$$6x + 3(14) = 126$$

$$6x + 42 = 126$$

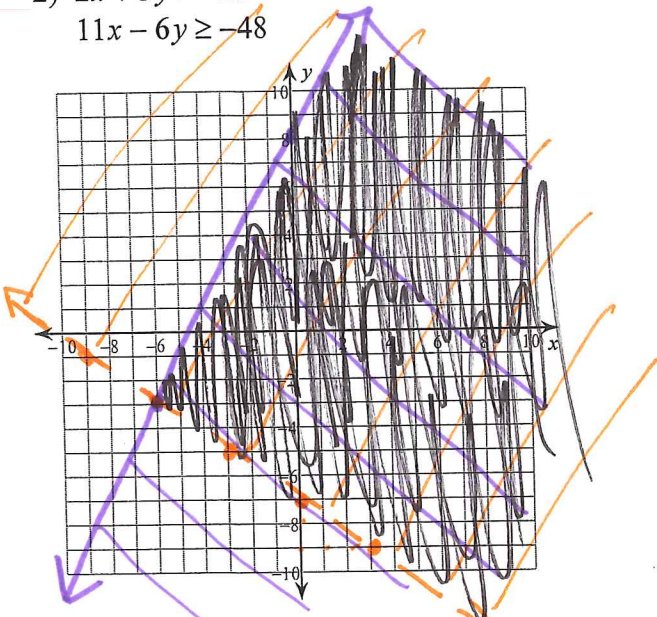
$$-42 \quad -42$$

$$6x = 84$$

$$x = 14$$

Sketch the solution to each system of inequalities.

12) $2x + 3y > -21$
 $11x - 6y \geq -48$



$$\begin{array}{r} 2x + 3y > -21 \\ -2x \quad -2x \\ \hline \end{array}$$

$$\frac{3y}{3} > \frac{-2x - 21}{3}$$

$$y > -\frac{2}{3}x - 7$$

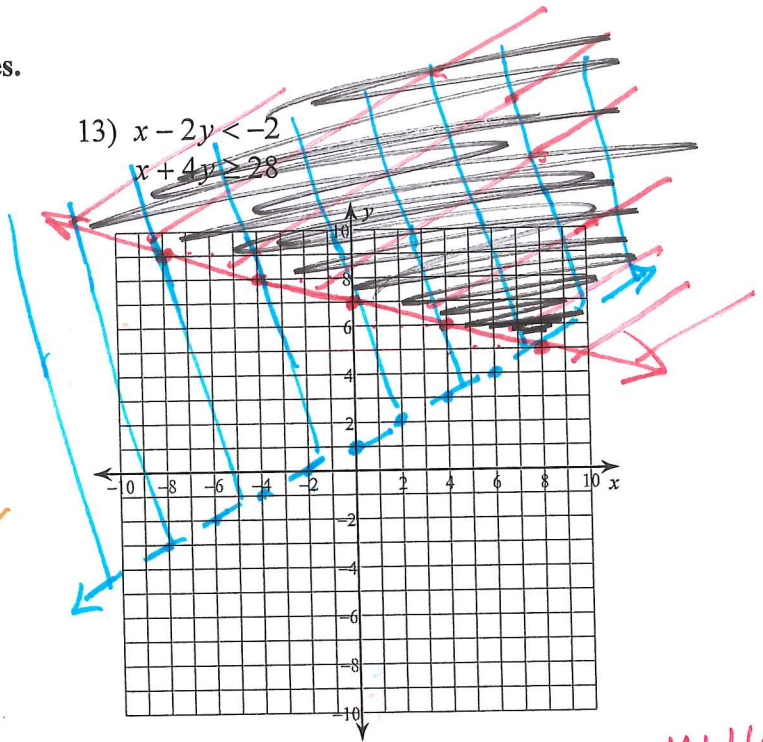
$$\begin{array}{r} 11x - 6y \geq -48 \\ -11x \quad -11x \\ \hline \end{array}$$

$$\frac{-6y}{-6} \geq \frac{-11x - 48}{-6}$$

$$y \leq \frac{11}{6}x + 8$$

↑
flip sign!

13) $x - 2y < -2$
 $x + 4y \geq 28$



$$\begin{array}{r} x - 2y < -2 \\ -x \quad -x \\ \hline \end{array}$$

$$\frac{-2y}{-2} < \frac{-x - 2}{-2}$$

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

↑
flip sign!

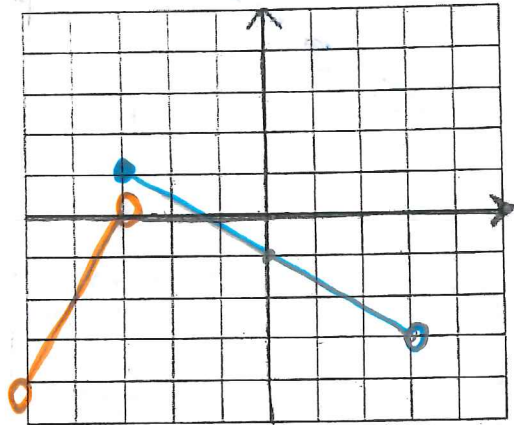
$$\begin{array}{r} x + 4y \geq 28 \\ -x \quad -x \\ \hline \end{array}$$

$$\frac{4y}{4} \geq \frac{-x + 28}{4}$$

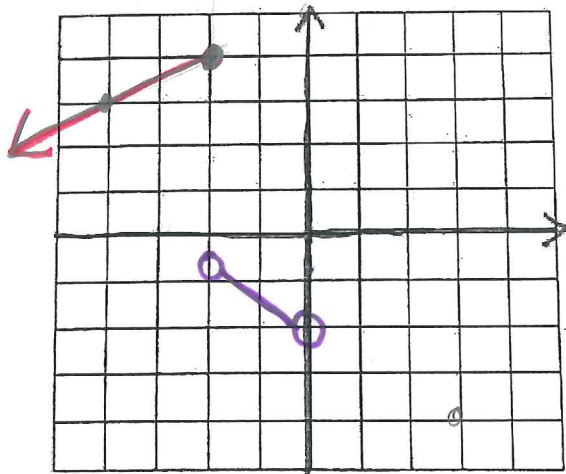
$$y \geq -\frac{1}{4}x + 7$$

Please graph the following piecewise functions.

$$14. f(x) = \begin{cases} 2x+6 & \text{if } -5 < x < -3 \\ -\frac{2}{3}x-1 & \text{if } -3 \leq x < 3 \end{cases}$$



$$15. f(x) = \begin{cases} \frac{1}{2}x+5 & \text{if } x \leq -2 \\ -\frac{2}{3}x-2 & \text{if } -2 < x < 0 \end{cases}$$



near Programming Review for Test

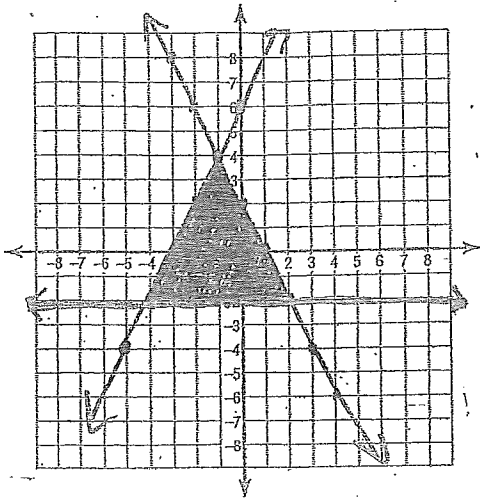
Multiple Choice

Identify the choice that best completes the statement or answers the question.

Find the coordinates of the vertices of the figure formed by each system of inequalities.

16. $y \geq -2$ horiz.

$2x + y \leq 2$
 $y \leq -2x + 2$
 $y \leq 2x + 6$



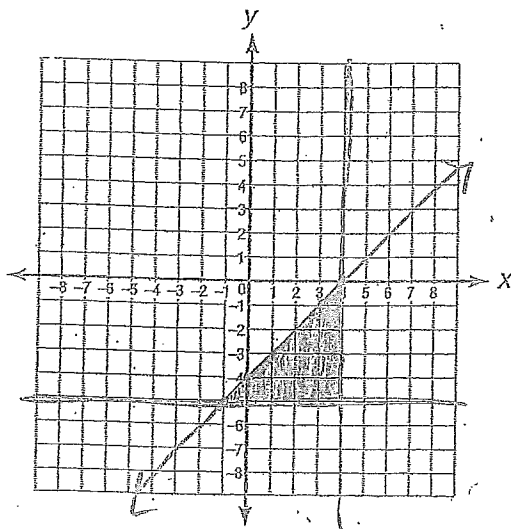
Give new graph

- a. $(2, -2), (-4, -2), (-1, 4)$
- b. $(2, 4), (-1, -2), (-4, -2)$
- c. $(2, -2), (4, 2), (1, -4)$
- d. $(2, -2), (4, -2), (0, -8)$

Plot the feasible region graphically, and find the max and min values.

17. $y \geq -5$ hor.
 $x \leq 4$ vert.
 $y \leq x - 4$
 $f(x,y) = x + y$

Give new graph



$x + y$
 $(-1, -5) = -1 + -5 = -6$ mi
 $(4, 0) = 4 + 0 = 4$ ma
 $(4, -5) = 4 + -5 = -1$

Part Answer

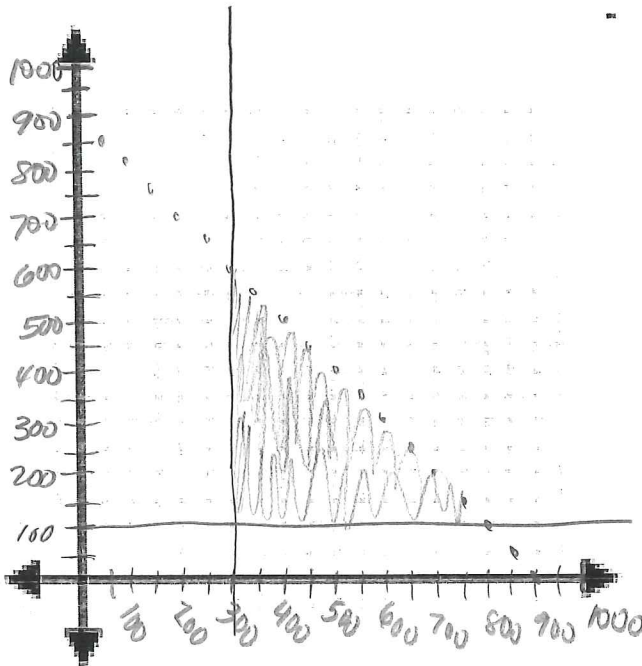
18. The theatre department at Dakota is selling tickets to the musical. They must sell at least 300 student tickets and at least 100 adult tickets. The auditorium will hold 900 people.
- A. Define the variables.

x: stud fix
y: adult fix

- B. Write the constraint inequalities.

$$\begin{array}{r} x \geq 300 \\ y \geq 100 \\ x + y \leq 900 \\ y \leq -x + 900 \end{array}$$

- C. Graph the constraints.



- D. If Dakota charges \$4 for a student ticket and \$5.50 for an adult ticket. What is the maximum income they can take in for a show?

$$4x + 5.50y$$

$$(800, 100) = 4(800) + 5.5(100) = 3750$$

$$(300, 600) = 4(300) + 5.5(600) = \boxed{4500}$$

$$(300, 100) = 4(300) + 5.5(100) = 1750$$

$$\boxed{300, 600}$$

