

Name _____

Date _____

Algebra 1-2 Chapter 6 Final Exam Review

6-1: Solving Systems by Graphing

6-2: Solving Systems by Substitution

6-3: Solving Systems by Elimination

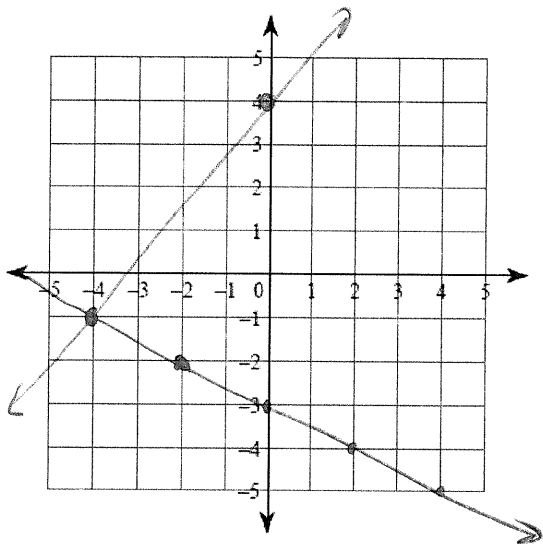
6-5: Linear Inequalities of 2 Variables.

6-6: Solving Linear Systems of Inequalities

Solve each system by graphing.

1) $y = \frac{5}{4}x + 4$

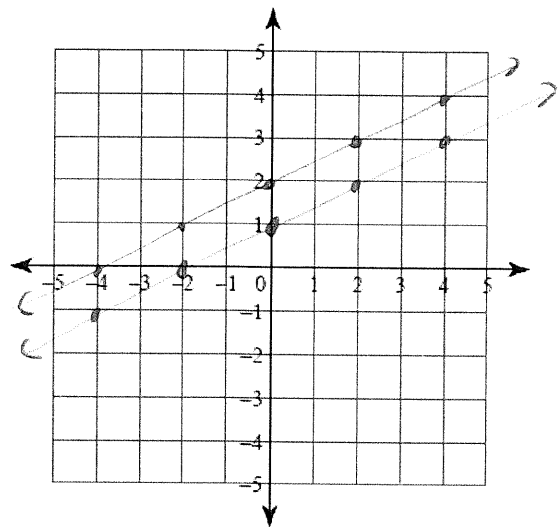
$y = -\frac{1}{2}x - 3$

 $(-4, -1)$ 

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

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

No solution

**Solve each system by substitution.**

3) $y = 3x - 23$

$y = -6x + 22$

$y = y$

$$\begin{array}{r} 3x - 23 = -6x + 22 \\ +6x \quad \quad +6x \end{array}$$

$$\begin{array}{r} 9x - 23 = 22 \\ +23 \quad +23 \end{array}$$

$$\frac{9x}{9} = \frac{45}{9}$$

$x = 5$

$y = 3(5) - 23$

$y = 15 - 23$

$y = -8$

 $(5, -8)$

4) $y = -2x + 5$

$y = -6x + 21$

$y = y$

$$\begin{array}{r} -2x + 5 = -6x + 21 \\ +6x \quad \quad +6x \end{array}$$

$$\begin{array}{r} 4x + 5 = 21 \\ -5 \quad -5 \end{array}$$

$$\frac{4x}{4} = \frac{16}{4}$$

$x = 4$

$y = -2(4) + 5$

$y = -8 + 5$

$y = -3$

 $(4, -3)$

Solve each system by substitution.

5) $y = x + 9$

$5x + 8y = -6$

$5x + 8(x + 9) = -6$

$5x + 8x + 72 = -6$
 $-72 -72$

$\frac{13x}{13} = \frac{-78}{13}$

$x = -6$

$y = -6 + 9$

$y = 3$

$(-6, 3)$

6) $-6x + 4y = -8$

$y = -3x - 11$

$-6x + 4(-3x - 11) = -8$

$-6x - 12x - 44 = -8$

$-18x - 44 = -8$
 $+44 +44$

$\frac{-18x}{-18} = \frac{36}{-18}$

$x = -2$

$y = -3(-2) - 11$

$y = 6 - 11$

$y = -5$

$(-2, -5)$

7) $-3x + 8y = -16$

$x + 3y = -6$

$-3y -3y$

$x = -3y - 6$

$-3(-3y - 6) + 8y = -16$

$9y + 18 + 8y = -16$
 $-18 -18$

$\frac{17y}{17} = \frac{-34}{17}$

$y = -2$

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

$x - 6 = -6$

$+6 +6$

$x = 0$

$(0, -2)$

8) $x - 4y = 21$

$-x - 2y = 9$

$x = 4y + 21$

$-(4y + 21) - 2y = 9$

$-4y - 21 - 2y = 9$
 $+21 +21$

$\frac{-6y}{-6} = \frac{30}{-6}$

$y = -5$

$x = 4(-5) + 21$

$x = -20 + 21$

$x = 1$

$(1, -5)$

Solve each system by elimination.

9) $2x + 5y = -5$

$3x - 5y = 5$

$\frac{5x}{5} = \frac{0}{5}$

$x = 0$

$2(0) + 5y = -5$

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

$y = -1$

$(0, -1)$

10) $10x + 7y = 13$

$-10x + 10y = -30$

$\frac{17y}{17} = \frac{-17}{17}$

$y = -1$

$10x + 7(-1) = 13$

$10x - 7 = 13$
 $+7 +7$

$\frac{10x}{10} = \frac{20}{10}$

$x = 2$

$(2, -1)$

Solve each system by elimination.

$$11) \begin{cases} -3x - 5y = 7 \\ -4x - 5y = 11 \end{cases} \xrightarrow{-1} \begin{cases} 3x + 5y = -7 \\ -4x - 5y = 11 \end{cases}$$

$$\begin{array}{r} +x = 4 \\ \hline +1 \quad -1 \\ \hline x = -4 \end{array}$$

$$\begin{array}{r} -3(-4) - 5y = 7 \\ \hline 12 - 5y = 7 \\ \hline -12 \quad -12 \\ \hline -5y = -5 \\ \hline y = 1 \end{array}$$

$$\boxed{(-4, 1)}$$

$$12) \begin{cases} 4x - 9y = -2 \\ -4x + 5y = -30 \end{cases} \xrightarrow{(-1)}$$

$$\begin{array}{r} 4x + 9y = 2 \\ -4x + 5y = -30 \\ \hline \end{array}$$

$$\begin{array}{r} 14y = -28 \\ \hline 14 \quad 14 \\ \hline y = -2 \end{array}$$

$$y = -2$$

$$\begin{array}{r} -4x - 9(-2) = -2 \\ \hline -4x + 18 = -2 \\ \hline -18 \quad -18 \\ \hline -4x = -20 \\ \hline -4 \quad -4 \\ \hline x = 5 \end{array}$$

$$x = 5$$

$$\boxed{(5, -2)}$$

$$13) \begin{cases} -6x - y = 13 \\ -8x + 8y = 8 \end{cases} \xrightarrow{y=1}$$

$$\begin{array}{r} -48x - 8y = 104 \\ + \quad -8x + 8y = 8 \\ \hline \end{array}$$

$$\begin{array}{r} -56x = 112 \\ \hline -56 \quad -56 \\ \hline x = -2 \end{array}$$

$$x = -2$$

$$\boxed{(-2, -1)}$$

$$\begin{array}{r} -6(-2) - y = 13 \\ \hline 12 - y = 13 \\ \hline -12 \quad -12 \\ \hline +y = 1 \\ \hline +1 \quad -1 \\ \hline y = -1 \end{array}$$

$$14) \begin{cases} -6x - y = -29 \\ 12x + 8y = 16 \end{cases}$$

$$\begin{array}{r} -12x - 2y = -58 \\ 12x + 8y = 16 \\ \hline \end{array}$$

$$\begin{array}{r} 6y = -42 \\ \hline 6 \quad 6 \\ \hline y = -7 \end{array}$$

$$y = -7$$

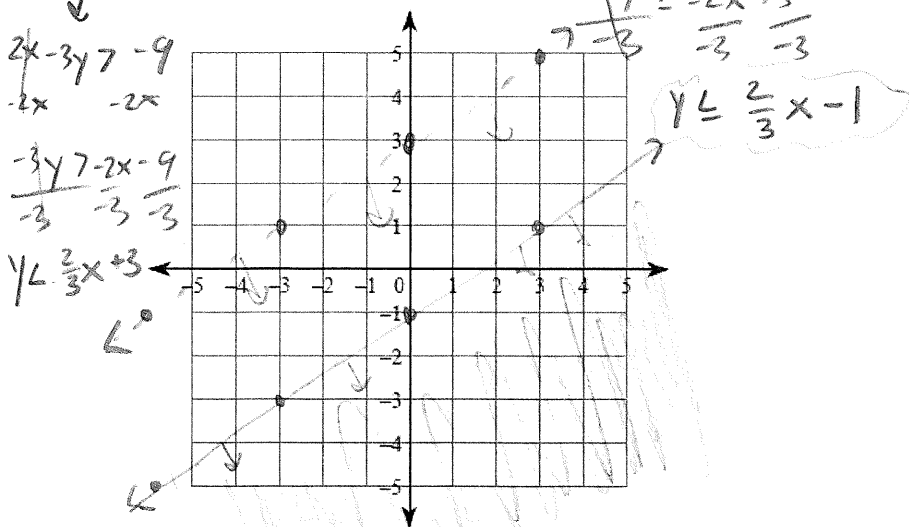
$$\boxed{(6, -7)}$$

$$\begin{array}{r} -6x - (-7) = -29 \\ \hline -6x + 7 = -29 \\ \hline -7 \quad -7 \\ \hline -6x = -36 \\ \hline -6 \quad -6 \\ \hline x = 6 \end{array}$$

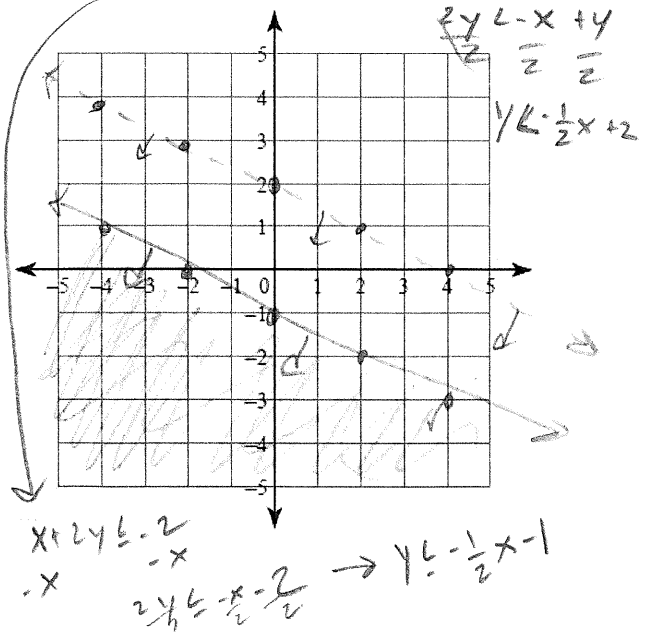
$$x = 6$$

Sketch the solution to each system of inequalities.

$$17) \begin{cases} 2x - 3y \geq 3 \\ 2x - 3y > -9 \end{cases} \rightarrow \begin{cases} 2x - 3y \geq 3 \\ -2x - 3y > -9 \end{cases}$$



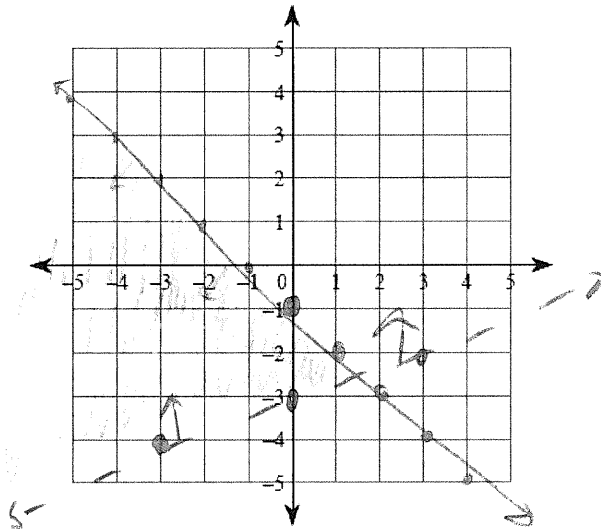
$$18) \begin{cases} x + 2y < 4 \\ x + 2y \leq -2 \end{cases} \rightarrow \begin{cases} x + 2y < 4 \\ -x + 2y \leq -2 \end{cases}$$



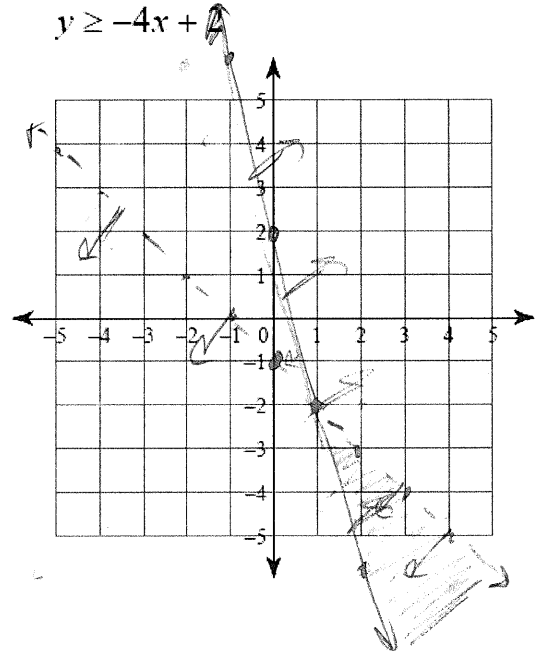
Sketch the solution to each system of inequalities.

19) $y > \frac{1}{3}x - 3$

$y \leq -x + 1$



20) $y < -x - 1$
 $y \geq -4x + 1$



21) The county fair is a popular field trip destination. This year the senior class at High School A and the senior class at High School B both planned trips there. The senior class at High School A rented and filled 12 vans and 6 buses with 342 students. High School B rented and filled 3 vans and 12 buses with 558 students. Every van had the same number of students in it as did the buses. Find the number of students in each van and in each bus.

$x = \#$ students in a van
 $y = \#$ students in a bus

$$\begin{array}{r} \text{A: } 12x + 6y = 342 \quad (-2) \rightarrow -24x - 12y = -684 \\ \text{B: } 3x + 12y = 558 \quad \rightarrow + 3x + 12y = 558 \\ \hline \end{array}$$

$$\begin{array}{r} -21x = -126 \\ -21 \quad \quad -21 \\ \hline x = 6 \end{array}$$

6 students in a van.
 45 " " " bus.

$$3(6) + 12y = 558$$

$$18 + 12y = 558$$

$$\begin{array}{r} -18 \quad \quad -18 \\ 12y = 540 \\ \hline 12 \quad \quad 12 \end{array}$$

$y = 45$

22) Totsakan and Eugene each improved their yards by planting hostas and shrubs. They bought their supplies from the same store. Totsakan spent \$108 on 11 hostas and 14 shrubs. Eugene spent \$39 on 3 hostas and 7 shrubs. Find the cost of one hosta and the cost of one shrub.

$x =$ cost of a hosta
 $y =$ " " " shrub

$$\begin{array}{r} 11x + 14y = 108 \\ -2(3x + 7y = 39) \rightarrow -6x - 14y = -78 \\ \hline \end{array}$$

$$\begin{array}{r} 5x = 30 \\ \hline 5 \quad \quad 5 \\ x = 6 \end{array}$$

$$3(6) + 7y = 39$$

$$18 + 7y = 39$$

$$\begin{array}{r} -18 \quad \quad -18 \\ 7y = 21 \\ \hline 7 \quad \quad 7 \end{array} \rightarrow y = 3$$

#6 for 1 hosta
 #3 for 1 shrub

- 25) Shawna's school is selling tickets to a spring musical. On the first day of ticket sales the school sold 8 adult tickets and 12 child tickets for a total of \$180. The school took in \$73 on the second day by selling 7 adult tickets and 4 child tickets. Find the price of an adult ticket and the price of a child ticket.

$x = \text{price adult ticket}$
 $y = \text{" child "}$

$$\begin{array}{r} 8x + 12y = 180 \\ -3(7x + 4y = 73) \rightarrow -21x - 12y = -219 \\ \hline -13x = -39 \\ \hline -13 \quad -13 \\ \hline x = 3 \end{array}$$

$\$3 / \text{adult ticket}$
 $\$13 / \text{child ticket}$

$$\begin{array}{r} 7(3) + 4y = 73 \\ 21 + 4y = 73 \\ -21 \quad -21 \\ \hline 4y = 52 \\ \hline y = 13 \end{array}$$

$$\begin{array}{r} 4y = 52 \\ \hline 4 \quad 4 \\ \hline y = 13 \end{array}$$

- 26) Yellowstone National Park is a popular field trip destination. This year the senior class at High School A and the senior class at High School B both planned trips there. The senior class at High School A rented and filled 10 vans and 7 buses with 411 students. High School B rented and filled 11 vans and 14 buses with 723 students. Every van had the same number of students in it as did the buses. How many students can a van carry? How many students can a bus carry?

$x = \# \text{ students a van can hold}$
 $y = \# \text{ students a bus can hold}$

$$\begin{array}{r} \underline{A:} \quad (10x + 7y = 411) \cdot (-2) \\ \underline{B:} \quad 11x + 14y = 723 \\ \downarrow \end{array}$$

$$10(10) + 7y = 411$$

$$\begin{array}{r} 110 + 7y = 411 \\ -110 \quad -110 \\ \hline 7y = 301 \\ \hline y = 43 \end{array}$$

$$\begin{array}{r} 7y = 301 \\ \hline 7 \quad 7 \\ \hline y = 43 \end{array}$$

$$\begin{array}{r} -20x - 14y = -822 \\ 11x + 14y = 723 \quad + \\ \hline -9x = -99 \\ \hline -9 \quad -9 \\ \hline x = 11 \end{array}$$

$$\begin{array}{r} -9x = -99 \\ \hline -9 \quad -9 \\ \hline x = 11 \end{array}$$

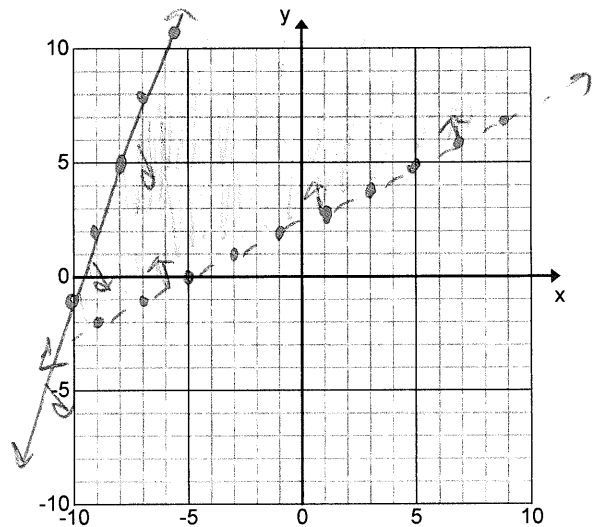
$$x = 11$$

11 students in a van
 43 " " " bus

27) Graph the systems of inequalities.

$$y - 3 > \frac{1}{2}(x - 1) \rightarrow (1, 3), m = \frac{1}{2}$$

$$y - 5 \leq 3(x + 8) \rightarrow (-8, 5), m = 3$$



Two Solutions:

Anything in the shaded region.

28) Suppose you have a part-time job delivering pizzas. Your employer pays you at a flat rate of \$7 per hour. You learn that a competitor pays employees \$2 per hour plus \$0.35 per delivery. Write a system of equations to model this situation. Define your variables. Determine how many deliveries you would need to make in four hours to equal your current four hour wage?

Your Employer: $y = 7x$

Competitor: $y = 2x + 0.35d$

y = total money earned
 x = # hours
 d = # deliveries

$$y = y$$

$$7(4) = 2(4) + 0.35d$$

$$28 = 8 + 0.35d$$

$$\begin{array}{r} 28 \\ -8 \\ \hline 20 \end{array} = \frac{0.35d}{0.35}$$

$57.4 = d$

58 deliveries

ANSWERS

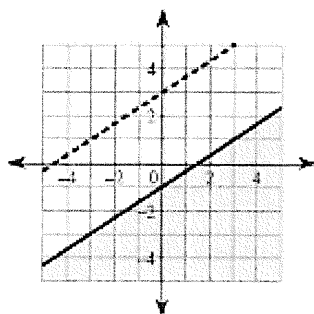
1) $(-4, -1)$

5) $(-6, 3)$

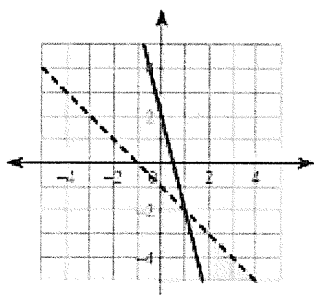
9) $(0, -1)$

13) $(-2, -1)$

17)



20)



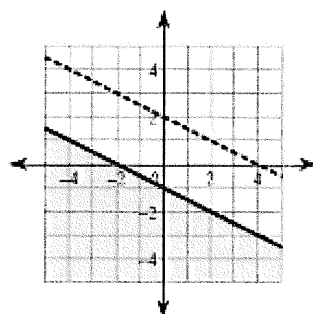
2) No solution

6) $(-2, -5)$

10) $(2, -1)$

14) $(6, -7)$

18)



21) Van: 6, Bus: 45

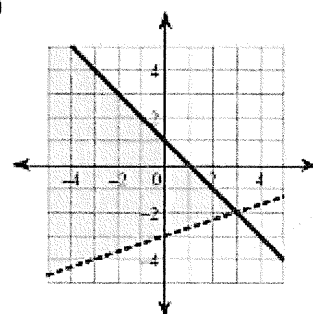
3) $(5, -8)$

7) $(0, -2)$

11) $(-4, 1)$

15) $(-10, -5)$

19)



22) hosta: \$6, shrub: \$3

25) adult ticket: \$3, child ticket: \$13

26) Van: 11, Bus: 43

28) 58 deliveries

