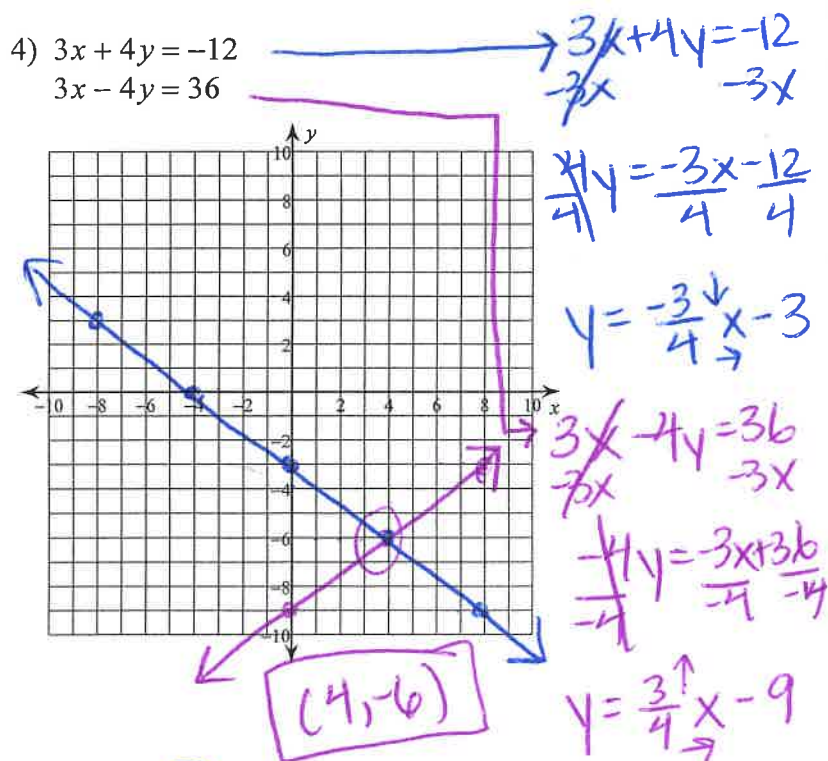
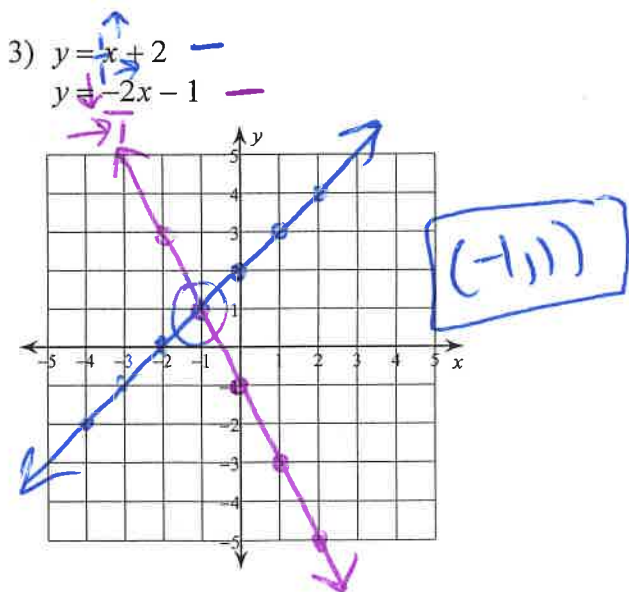
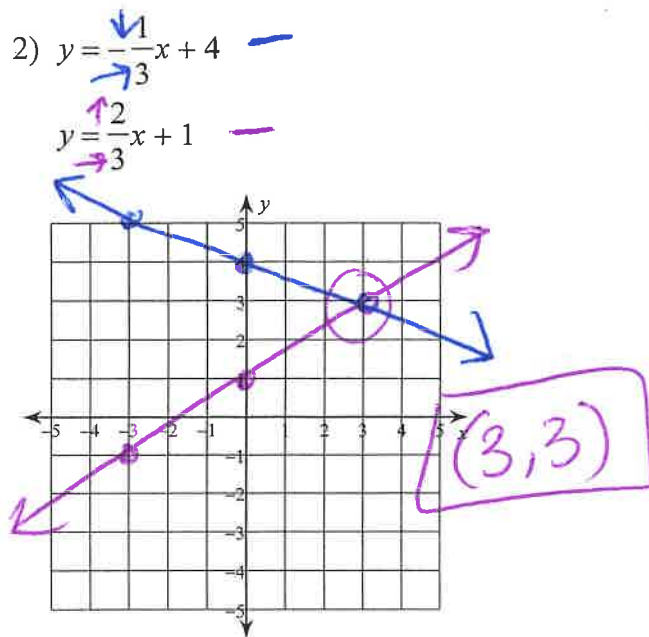
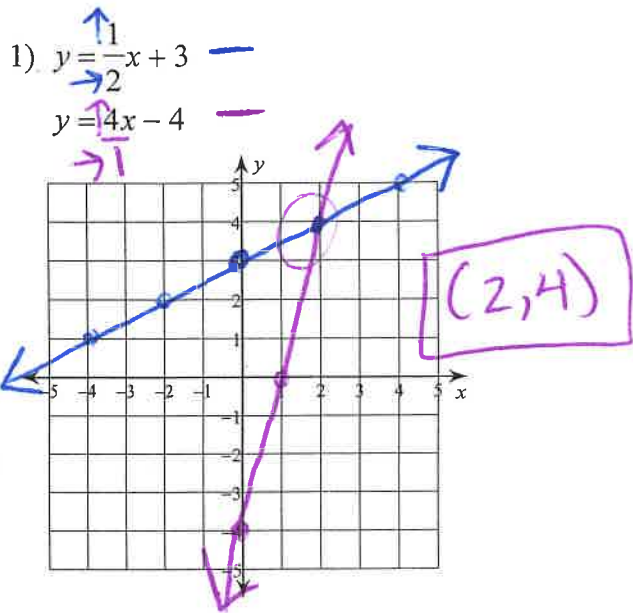


Unit 6 Study Guide

Solve each system by graphing.



Solve each system by substitution.

5)  $y = 3x + 5$   
 $y = x + 3$

$$\begin{aligned} 3x + 5 &= x + 3 \\ -x & \quad -x \\ \hline 2x + 5 &= 3 \\ 2x &= 3 - 5 \\ 2x &= -2 \\ x &= -1 \end{aligned}$$

$$\begin{aligned} y &= 3(-1) + 5 \\ y &= -3 + 5 \\ y &= 2 \end{aligned}$$

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

6)  $-6x + 3y = 1$   
 $y = 2x + 2$

$$\begin{aligned} -6x + 3(2x + 2) &= 1 \\ -6x + 6x + 6 &= 1 \\ 6 &= 1 \end{aligned}$$

$2 \neq 1$  |  $\boxed{\text{No solution}}$

$$7) \begin{cases} -4x - 4y = 16 \\ y = 2x + 8 \end{cases}$$

$$\begin{aligned} -4x - 4(2x + 8) &= 16 \\ -4x - 8x - 32 &= 16 \\ -12x - 32 &= 16 \\ +32 &+32 \\ -12x &= 48 \\ \frac{-12x}{-12} &= \frac{48}{-12} \\ x &= -4 \end{aligned}$$

$$\begin{aligned} y &= 2(-4) + 8 \\ y &= -8 + 8 \\ y &= 0 \end{aligned}$$

$$\boxed{(-4, 0)}$$

$$9) \begin{cases} 3x + y = -19 \\ -6x - 6y = 18 \end{cases} \rightarrow y = -3x - 19$$

$$\begin{aligned} -6x - 6(-3x - 19) &= 18 \\ -6x + 18x + 114 &= 18 \\ 12x + 114 &= 18 \\ -114 &-114 \\ 12x &= -96 \\ \frac{12x}{12} &= \frac{-96}{12} \\ x &= -8 \end{aligned}$$

$$\begin{aligned} y &= -3(-8) - 19 \\ y &= 24 - 19 \\ y &= 5 \end{aligned}$$

$$\boxed{(-8, 5)}$$

$$8) \begin{cases} 5x + y = -2 \\ -x - 5y = -14 \end{cases} \rightarrow y = -5x - 2$$

$$\begin{aligned} -x - 5(-5x - 2) &= -14 \\ -x + 25x + 10 &= -14 \\ 24x + 10 &= -14 \\ -10 &-10 \\ 24x &= -24 \\ \frac{24x}{24} &= \frac{-24}{24} \\ x &= -1 \end{aligned}$$

$$\begin{aligned} y &= -5(-1) - 2 \\ y &= 5 - 2 \\ y &= 3 \end{aligned}$$

$$\boxed{(-1, 3)}$$

$$10) \begin{cases} -4x - 8y = -8 \\ 3x + y = 1 \end{cases}$$

$$\begin{aligned} -4x - 8(3x + 1) &= -8 \\ -4x + 24x - 8 &= -8 \\ 20x - 8 &= -8 \\ +8 &+8 \\ 20x &= 0 \\ \frac{20x}{20} &= \frac{0}{20} \\ x &= 0 \end{aligned}$$

$$\begin{aligned} y &= 3(0) + 1 \\ y &= 1 \end{aligned}$$

$$\boxed{(0, 1)}$$

Solve each system by elimination.

$$11) \begin{cases} -3x + 2y = 5 \\ 3x - 5y = -8 \end{cases}$$

$$\begin{aligned} -3x + 2y &= 5 \\ +3x - 5y &= -8 \\ \hline -3y &= -3 \\ \frac{-3y}{-3} &= \frac{-3}{-3} \\ y &= 1 \end{aligned}$$

$$\begin{aligned} -3x + 2(1) &= 5 \\ -3x + 2 &= 5 \\ -2 &-2 \\ -3x &= 3 \\ \frac{-3x}{-3} &= \frac{3}{-3} \\ x &= -1 \end{aligned}$$

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

$$12) \begin{cases} x - 4y = 18 \\ -3x - 8y = 6 \end{cases} \rightarrow \begin{cases} 3x - 4y = 18 \\ -3x - 8y = 6 \end{cases}$$

$$\begin{aligned} 3x - 4y &= 18 \\ -3x - 8y &= 6 \\ \hline -12y &= 24 \\ \frac{-12y}{-12} &= \frac{24}{-12} \\ y &= -2 \end{aligned}$$

$$\begin{aligned} x - 4(-2) &= 18 \\ x + 8 &= 18 \\ -8 &-8 \\ x &= 10 \end{aligned}$$

$$\boxed{(10, -2)}$$

$$13) \begin{cases} 4x - 4y = -4 \\ -2x - 3y = 17 \end{cases} \rightarrow \begin{cases} 4x - 4y = -4 \\ -4x - 6y = 34 \end{cases}$$

$$\begin{aligned} 4x - 4(-3) &= -4 \\ 4x + 12 &= -4 \\ -12 &-12 \\ 4x &= -16 \\ \frac{4x}{4} &= \frac{-16}{4} \\ x &= -4 \end{aligned}$$

$$\begin{aligned} -4x - 6y &= 34 \\ +4x - 4y &= -4 \\ \hline -10y &= 30 \\ \frac{-10y}{-10} &= \frac{30}{-10} \\ y &= -3 \end{aligned}$$

$$\boxed{(-4, -3)}$$

$$14) \begin{cases} -20x - 7y = -27 \\ 10x - 8y = 2 \end{cases} \rightarrow \begin{cases} -20x - 7y = -27 \\ +20x - 16y = 4 \end{cases}$$

$$\begin{aligned} -20x - 7y &= -27 \\ +20x - 16y &= 4 \\ \hline -23y &= -23 \\ \frac{-23y}{-23} &= \frac{-23}{-23} \\ y &= 1 \end{aligned}$$

$$\begin{aligned} 10x - 8(1) &= 2 \\ 10x - 8 &= 2 \\ +8 &+8 \\ 10x &= 10 \\ \frac{10x}{10} &= \frac{10}{10} \\ x &= 1 \end{aligned}$$

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

$$15) \begin{cases} 2x - 10y = -20 \\ -3x + 2y = -9 \end{cases} \rightarrow \begin{cases} 2x - 10y = -20 \\ -15x + 10y = -45 \end{cases}$$

$$\begin{aligned} 2(5) - 10y &= -20 \\ 10 - 10y &= -20 \\ -10 &-10 \\ -10y &= -30 \\ \frac{-10y}{-10} &= \frac{-30}{-10} \\ y &= 3 \end{aligned}$$

$$\begin{aligned} -15x + 10y &= -45 \\ +15x - 10y &= -20 \\ \hline -13x &= -65 \\ \frac{-13x}{-13} &= \frac{-65}{-13} \\ x &= 5 \end{aligned}$$

$$\boxed{(5, 3)}$$

$$16) \begin{cases} -40x - 60y = 20 \\ -16x - 24y = 8 \end{cases} \rightarrow \begin{cases} 80x + 120y = -40 \\ -80x - 120y = 40 \end{cases}$$

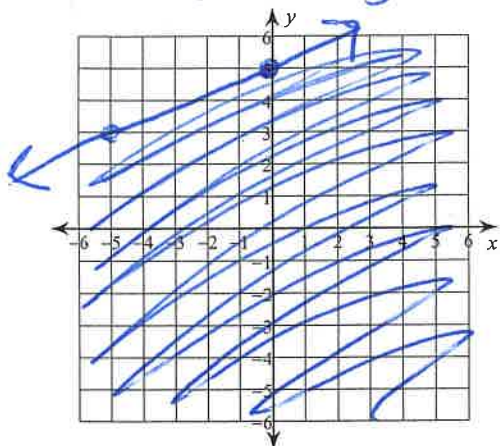
$$\begin{aligned} 80x + 120y &= -40 \\ -80x - 120y &= 40 \\ \hline 0 &= 0 \end{aligned}$$

$$\boxed{\text{Infinite}}$$

Sketch the graph of each linear inequality.

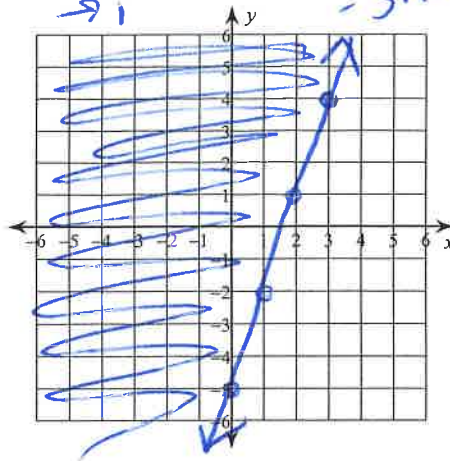
17)  $y \leq \frac{2}{5}x + 5$

- solid  
- shade below



18)  $y \geq 3x - 5$

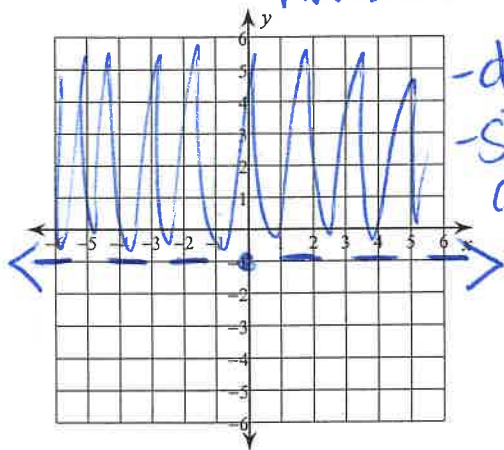
- solid  
- shade above



19)  $y > -1$

horizontal

- dotted  
- shade above

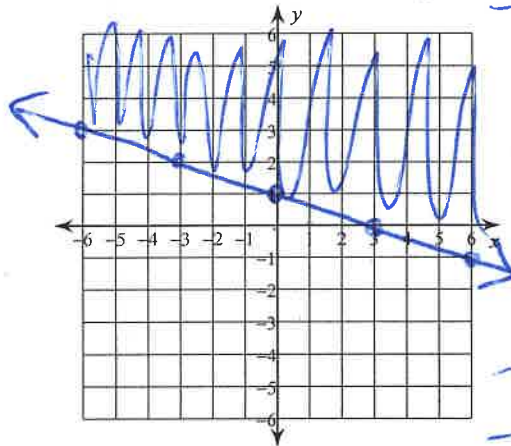


20)  $x + 3y \geq 3$

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

$3y \geq -x + 3$   
 $y \geq \frac{-x + 3}{3}$

$y \geq \frac{1}{3}x + 1$

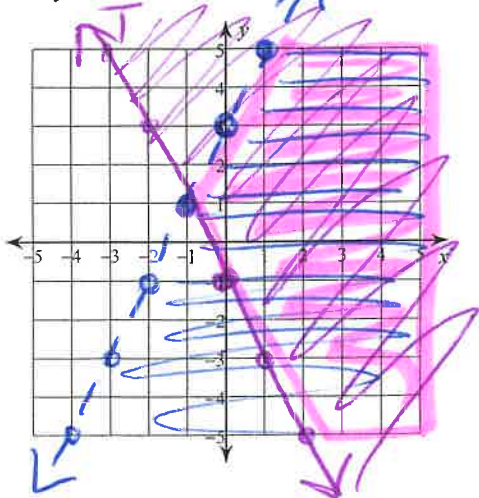


- solid  
- shade above

Sketch the solution to each system of inequalities.

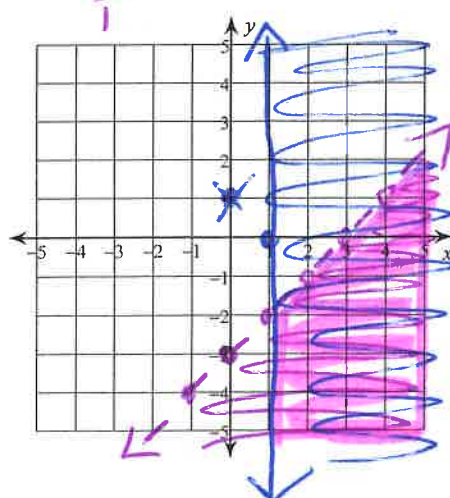
21)  $y < 2x + 3$

$y \geq -2x - 1$



22)  $x \geq 1$

$y < x - 3$



- 23) New York City 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 4 vans and 7 buses with 333 students. High School B rented and filled 12 vans and 8 buses with 440 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 - vans  
y - bus

$$\begin{aligned} -3(4x + 7y = 333) &\rightarrow -12x - 21y = -999 \\ 12x + 8y = 440 &\rightarrow +12x + 8y = 440 \end{aligned}$$

$$\frac{-13y = -559}{-13}$$

$$y = 43$$

$$4x + 7(43) = 333$$

$$4x + 301 = 333$$

$$4x = 32 \quad x = 8$$

8 vans  
43 buses

- 24) The state 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 7 buses with 432 students. High School B rented and filled 6 vans and 3 buses with 192 students. Each van and each bus carried the same number of students. How many students can a van carry? How many students can a bus carry?

x - vans  
y - buses

$$\begin{aligned} 12x + 7y = 432 &\rightarrow 12x + 7y = 432 \\ -2(6x + 3y = 192) &\rightarrow -12x - 6y = -384 \end{aligned}$$

$$y = 48$$

$$6x + 3(48) = 192$$

$$6x + 144 = 192$$

$$6x = 48 \quad x = 8$$

8 vans  
48 buses

- 25) The school that Mofor goes to is selling tickets to a play. On the first day of ticket sales the school sold 10 senior citizen tickets and 4 child tickets for a total of \$166. The school took in \$212 on the second day by selling 4 senior citizen tickets and 12 child tickets. What is the price each of one senior citizen ticket and one child ticket?

x - seniors  
y - child

$$\begin{aligned} -3(10x + 4y = 166) &\rightarrow -30x - 12y = -498 \\ 4x + 12y = 212 &\rightarrow 4x + 12y = 212 \end{aligned}$$

$$\frac{-26x = -286}{-26}$$

$$x = 11$$

$$4(11) + 12y = 212$$

$$44 + 12y = 212$$

$$\frac{12y = 168}{12} \quad y = 14$$

11 senior tickets  
14 child tickets

- 26) Elisa and Rob are selling pies for a school fundraiser. Customers can buy apple pies and blackberry pies. Elisa sold 10 apple pies and 8 blackberry pies for a total of \$198. Rob sold 3 apple pies and 6 blackberry pies for a total of \$117. What is the cost each of one apple pie and one blackberry pie?

x - apple  
y - blackberry

$$\begin{aligned} 3(10x + 8y = 198) &\rightarrow 30x + 24y = 594 \\ -4(3x + 6y = 117) &\rightarrow -12x - 24y = -468 \end{aligned}$$

$$\frac{18x = 126}{18}$$

$$x = 7$$

$$10(7) + 8y = 198$$

$$70 + 8y = 198$$

$$\frac{8y = 128}{8} \quad y = 16$$

7 apple pies  
16 blackberry