

# Chapter 1: Solve and Apply Equations and Inequalities

1.  $-8a - 3 > 11$   $a < -1.75$  or  $a > 1$

$$\begin{array}{r} -8a - 3 > 11 \\ +3 \quad +3 \\ \hline -8a > 14 \\ \frac{-8a}{-8} > \frac{14}{-8} \end{array}$$

$$\begin{array}{r} -8a - 3 < -11 \\ +3 \quad +3 \\ \hline -8a < -8 \\ \frac{-8a}{-8} < \frac{-8}{-8} \end{array}$$

2.  $\frac{a}{-a} - 6 \leq 15 + 8a$   $a \geq -3$

$$\begin{array}{r} \frac{a}{-a} - 6 \leq 15 + 8a \\ -15 \quad -15 \\ \hline -6 \leq 18 + 7a \\ \frac{-6}{7} \leq \frac{18}{7} + \frac{7a}{7} \\ -3 \leq a \end{array}$$

3.  $-3(4x + 3) + 4(6x + 1) = 43$

$$\begin{array}{r} -12x - 9 + 24x + 4 = 43 \\ 12x - 5 = 43 \\ +5 \quad +5 \\ \hline 12x = 48 \\ \frac{12x}{12} = \frac{48}{12} \end{array}$$
 $x = 4$ 

4.  $24a - 22 = -4(1 - 6a)$

$$\begin{array}{r} 24a - 22 = -4 + 24a \\ -24a \quad -24a \\ \hline -22 = -4 \end{array}$$
No Solution

5.  $\frac{12}{-12} + 4n > 44$  or  $\frac{10}{-10} - 12n > -38$

$$\begin{array}{r} 4n > 32 \\ \frac{4n}{4} > \frac{32}{4} \\ n > 8 \end{array}$$

$$\begin{array}{r} -12n > -48 \\ \frac{-12n}{-12} > \frac{-48}{-12} \\ n < 4 \end{array}$$

6.  $36 \leq \frac{1}{-11} - 5x \leq 66$

$$\begin{array}{r} 25 \leq -5x \leq 55 \\ \frac{25}{-5} \geq \frac{-5x}{-5} \geq \frac{55}{-5} \\ -5 \geq x \geq -11 \end{array}$$

7.  $9|x + 8| + 10 < 55$

$$\begin{array}{r} 9|x + 8| < 45 \\ \frac{9|x + 8|}{9} < \frac{45}{9} \\ |x + 8| < 5 \end{array}$$

$$\begin{array}{r} x + 8 < 5 \\ \frac{x + 8}{-8} < \frac{5}{-8} \\ x < -3 \end{array}$$

$$\begin{array}{r} x + 8 > -5 \\ \frac{x + 8}{-8} > \frac{-5}{-8} \\ x > -13 \end{array}$$
 $x < -3$  and  $x > -13$ 

8.  $|7p + 4| = 24$

$$\begin{array}{r} (7p + 4) = 24 \\ \frac{7p + 4}{-4} = \frac{24}{-4} \\ 7p = 20 \\ \frac{7p}{7} = \frac{20}{7} \\ p = \frac{20}{7} \end{array}$$

$$\begin{array}{r} (7p + 4) = -24 \\ \frac{7p + 4}{-4} = \frac{-24}{-4} \\ 7p = -28 \\ \frac{7p}{7} = \frac{-28}{7} \\ p = -4 \end{array}$$

9. Admission into the fair is \$12 and it costs \$1.75 for each ride. If you have \$30, how many rides can you go on? Write an inequality and solve.

$$\begin{array}{r} 12 + 1.75x \leq 30 \\ -12 \quad \quad -12 \\ \hline 1.75x \leq 18 \\ \hline 1.75 \quad \quad 1.75 \end{array}$$

$$x \leq 10.3$$

rides

## Chapter 2: Investigate Functions and Linear Applications

1. Is it a function? Yes or **No**

2. Is it a function? **Yes** or No

3. Is it a function? **Yes** or No

Domain

-1, 0, 1, 2, 3

Range

3, 5, 11, 21

Domain: -1, 0, 1, 2, 3      Range: 3, 5, 11, 21

4. Is it a function? Yes or **No**

Domain

2, -8, 1

Range

4, 0, 5, 3

Domain: 2, -8, 1      Range: 4, 0, 5, 3

5. Is it a function? **Yes** or No

$x$	1	2	4	5	8
$f(x)$	-2	-1	1	2	5

Domain: 1, 2, 4, 5, 8      Range: -2, -1, 1, 2, 5

6. Is it a function? Yes or **No**

$\begin{matrix} 1 \rightarrow -2 \\ \rightarrow 2 \end{matrix}$

(1, -2) (0, 0) (1, 2) (3, 5) (4, 7)

Domain: 1, 0, 3, 4      Range: -2, 0, 2, 5, 7

7. If  $f(x) = 2x - 5$  and  $g(x) = -3x + 4$ , find the following:

a)  $f(3)$

$$2(3) - 5$$

$$6 - 5$$

**1**

b)  $g(-2)$

$$-3(-2) + 4$$

$$6 + 4$$

**10**

c)  $f(-1) + g(3)$

$$2(-1) - 5 + (-3(3) + 4)$$

$$-2 + 5 - 9 + 4$$

$$3 - 5$$

**-2**

8. Write the equation of a line that is parallel to  $y = 2x - 6$  and passes through the point  $(5, -3)$

**-2**

$m = 2$

Point Slope Form:  $y + 3 = 2(x - 5)$

Slope Intercept Form:  $y = 2x - 13$

Standard Form:  $-2x + y = -13$

$$y + 3 = 2(x - 5)$$

$$y + 3 = 2x - 10$$

$$\underline{-13 \quad -3}$$

$$y = 2x - 13$$

9. Write the equation of a line that is perpendicular to  $y = 3x + 1$  and passes through the point  $(-6, -2)$ .

Point Slope Form:  $y + 2 = -\frac{1}{3}(x + 6)$

Slope Intercept Form:  $y = -\frac{1}{3}x - 4$

Standard Form:  $x + 3y = -12$

$$m = -\frac{1}{3}$$

$$y + 2 = -\frac{1}{3}(x + 6)$$

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

$$y = -\frac{1}{3}x - 4$$

10. An ant is climbing a 10 foot fence. After 3 minutes the ant is 4 feet up and after 5 minutes the ant is 8 feet up. Write an equation. When will the ant be at the top of the fence?

$$\begin{matrix} \text{min} & \text{ft} & \text{min} & \text{ft} \\ (3, 4) & & (5, 8) \end{matrix}$$

Equation:  $y - 4 = 2(x - 3)$

$$\frac{8 - 4}{5 - 3} = \frac{4}{2} = 2$$

When will ant be at top of the fence?

$$10 - 4 = 2(x - 3)$$

$$6 = 2x - 6$$

$$\begin{array}{r} +6 \\ \hline 12 = 2x \end{array}$$

$$\frac{12}{2} = \frac{2x}{2}$$

$$\boxed{6 = x \text{ min}}$$

# 9 continued

$$3(y = -\frac{1}{3}x - 4)$$

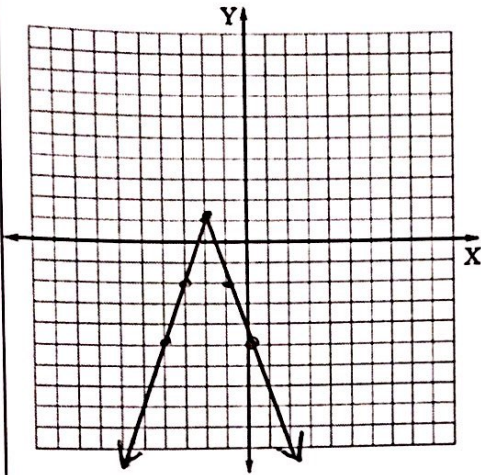
$$3y = -1x - 12$$

$$\begin{array}{r} +x \\ \hline x + 3y = -12 \end{array}$$

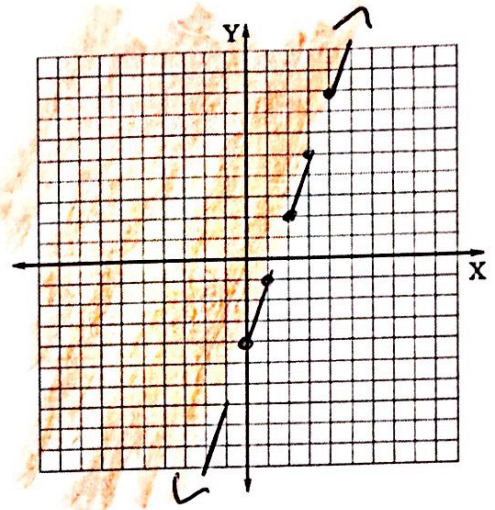
$$x + 3y = -12$$

## Chapter 2: Graph Functions and Inequalities

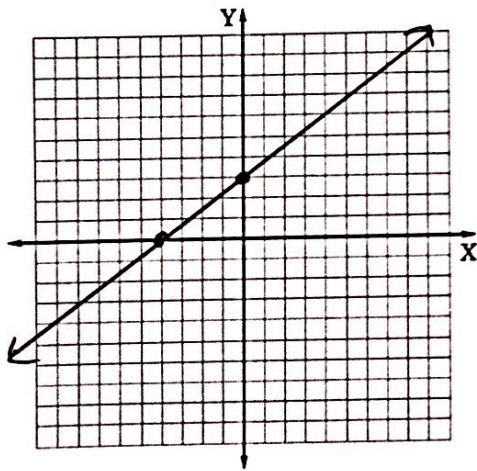
1.  $y = -3|x+2|+1$



2.  $y > 3x - 4$

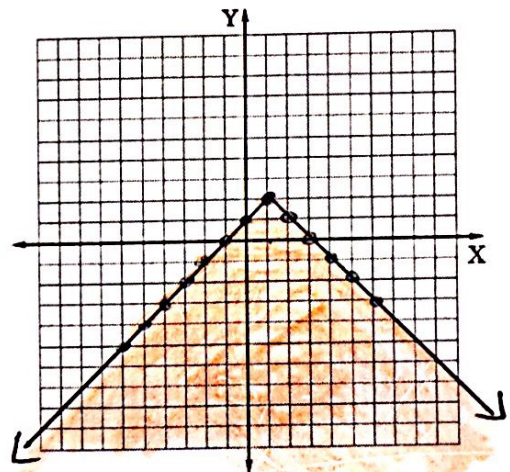


3.  $3x - 4y = -12$



x int: -4  
y int: 3

4.  $y \leq -|x-1|+2$

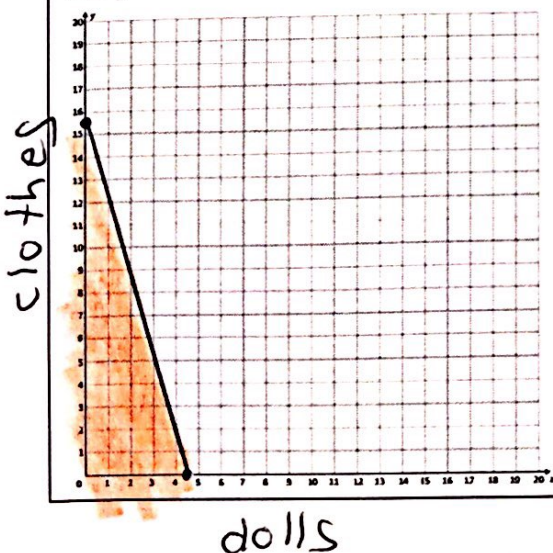


5. Jill is shopping for her kids birthday present at the American Girl Store and has atmost \$500 to spend. Dolls are \$115 each and outfits are \$32 each. Write an inequality to represent this situation and graph the possible solutions. Label each axis.

$$115x + 32y \leq 500$$

x int: 4.3

y int: 15.625



## Chapter 3: Solve and Apply Systems of Equations

1. 
$$\begin{cases} x+2y=4 \\ -(x-4y=16) \end{cases}$$

$$\begin{array}{r} -x/+4y = -16 \\ \underline{x+2y = 4} \\ 6y = -12 \\ \frac{6y}{6} = \frac{-12}{6} \\ y = -2 \end{array}$$

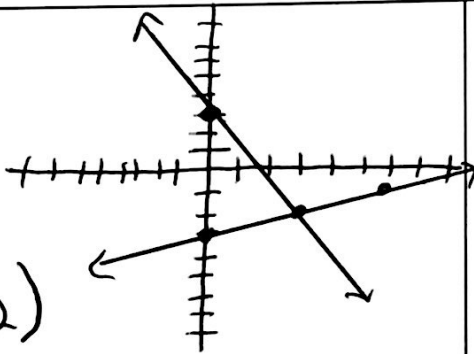
$$\begin{array}{r} x+2(-2) = 4 \\ x-4 = 4 \\ \underline{+4 \quad +4} \\ x = 8 \end{array}$$

(8, -2)

2. 
$$\begin{cases} y=3x-4 \\ 2y-6x=-8 \end{cases}$$

$$\begin{array}{r} 2(3x-4) - 6x = -8 \\ 6x - 8 - 6x = -8 \\ -8 = -8 \\ \text{infinitely many} \\ \text{solutions} \end{array}$$

3. 
$$\begin{cases} y = -\frac{5}{3}x + 3 \\ y = \frac{1}{3}x - 3 \end{cases}$$



(3, -2)

4. 
$$\begin{cases} -3x+3y=4 \\ (-x+y=3) \cdot 3 \end{cases}$$

$$\begin{array}{r} 3x-3y = -9 \\ \underline{-3x+3y = 4} \\ 0 = -5 \end{array}$$

No Solution

5. 
$$\begin{cases} 2x-3y=-1 \\ y=x-1 \end{cases}$$

$$\begin{array}{r} 2x-3(x-1) = -1 \\ 2x-3x+3 = -1 \\ -x+3 = -1 \\ \underline{-3 \quad -3} \\ -x = -4 \\ x = 4 \end{array}$$

(4, 3)

6. 
$$\begin{cases} (2x+y=20) \cdot 5 \\ 6x-5y=12 \end{cases}$$

$$\begin{array}{r} 2(7)+y = 20 \\ 14+y = 20 \\ \underline{-14 \quad -14} \\ y = 6 \end{array}$$

$$\begin{array}{r} 10x+5y = 100 \\ \underline{6x-5y = 12} \\ 16x = 112 \\ \frac{16x}{16} = \frac{112}{16} \\ x = 7 \end{array}$$

(7, 6)

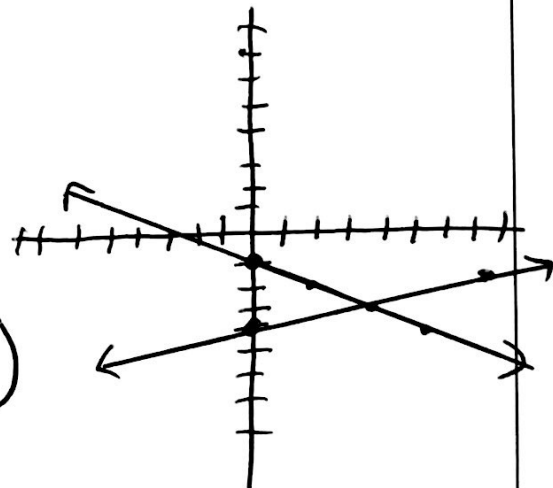
7. 
$$\begin{cases} 3(4x-y=2) \\ -12x+3y=-6 \end{cases}$$

$$\begin{array}{r} 12x-3y = 6 \\ \underline{-12x+3y = -6} \\ 0 = 0 \end{array}$$

Infinitely Many Solutions

8. 
$$\begin{cases} y = -\frac{1}{2}x - 1 \\ y = \frac{1}{4}x - 4 \end{cases}$$

$$y = \frac{1}{4}x - 4$$



(4, -3)

9.

The school that Stefan goes to is selling tickets to a choral performance. On the first day of ticket sales the school sold 3 senior citizen tickets and 1 child ticket for a total of \$38. The school took in \$52 on the second day by selling 3 senior citizen tickets and 2 child tickets. Find the price of a senior citizen ticket and the price of a child ticket.

$$\begin{aligned} 3x + 1y &= 38 \\ -1(3x + 2y &= 52) \end{aligned}$$

$x \rightarrow$  senior citizen \$  
 $y \rightarrow$  child \$

$$\begin{aligned} 3x + y &= 38 \\ -3x - 2y &= -52 \\ \hline -y &= -14 \end{aligned}$$

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

$$\begin{aligned} 3x + 1y &= 38 \\ -1y - 1y &= -14 \\ \hline 3x &= 24 \\ \frac{3}{3} & \quad \frac{3}{3} \end{aligned}$$

$$x = 8 \text{ senior citizen}$$

10.

A test has twenty questions worth 100 points. The test consists of True/False questions worth 3 points each and multiple choice questions worth 11 points each. How many multiple choice questions are on the test?

$$\begin{aligned} -3(x + y &= 20) \\ 3x + 11y &= 100 \end{aligned}$$

$x \rightarrow$  True/False  
 $y \rightarrow$  Multiple choice

$$\begin{aligned} -3x - 3y &= -60 \\ 3x + 11y &= 100 \\ \hline 8y &= 40 \\ \frac{8}{8} & \quad \frac{8}{8} \end{aligned}$$

$$y = 5 \text{ multiple choice}$$

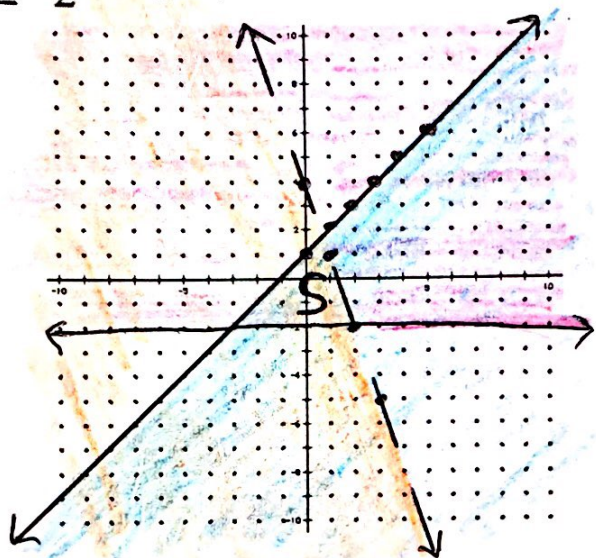
$$\begin{aligned} x + y &= 20 \\ -y - y &= -5 \end{aligned}$$

$$\begin{aligned} x &= 15 \\ \text{True/False} \end{aligned}$$

## Chapter 3: Solve and Apply Systems of Inequalities

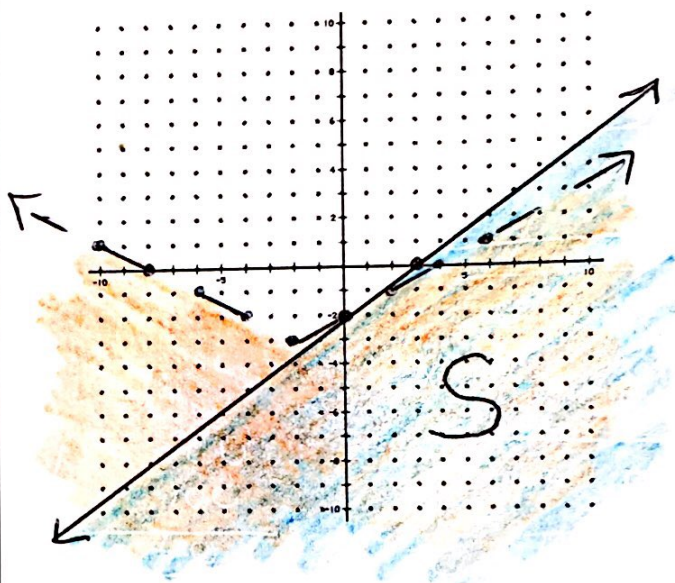
1.

$$\begin{cases} y < -3x + 4 & \text{dashed} \rightarrow \text{shade below} \\ y \leq x + 1 & \text{solid} \rightarrow \text{shade below} \\ y \geq -2 & \text{solid} \rightarrow \text{shade above} \end{cases}$$



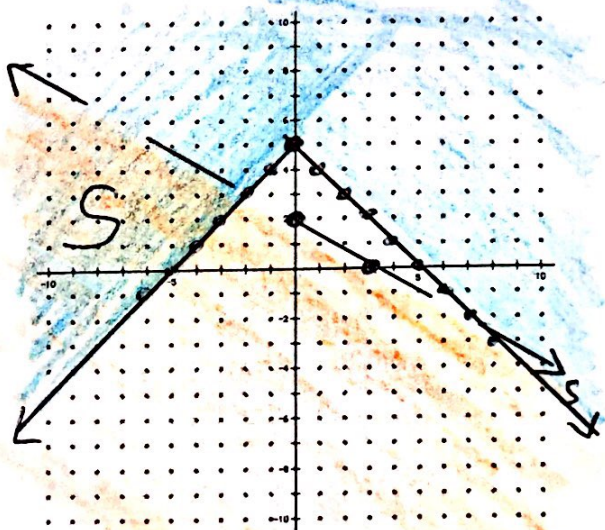
2.

$$\begin{cases} y < \frac{1}{2}|x + 2| - 3 & \text{dashed} \rightarrow \text{shade below} \\ 2x - 3y \geq 6 & \text{solid} \rightarrow \text{shade below} \end{cases}$$



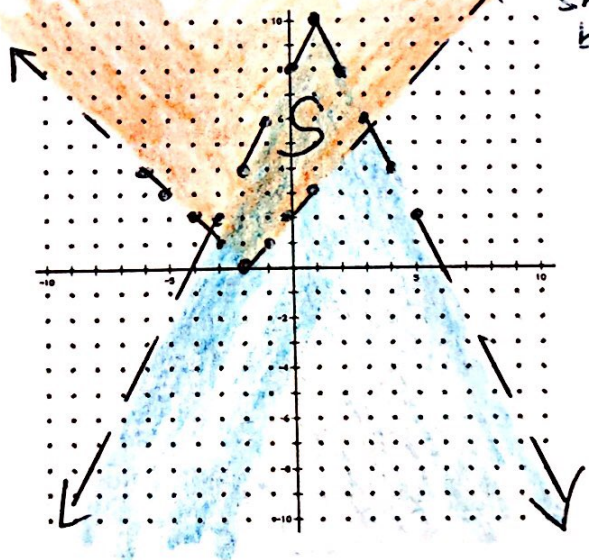
3.

$$\begin{cases} 4x + 6y < 12 & \text{dashed} \rightarrow \text{shade below} \\ y \geq -|x| + 5 & \text{solid} \rightarrow \text{shade above} \end{cases}$$



4.

$$\begin{cases} y > |x + 2| & \text{dashed} \rightarrow \text{shade above} \\ y < -2|x - 1| + 10 & \text{dashed} \rightarrow \text{shade below} \end{cases}$$

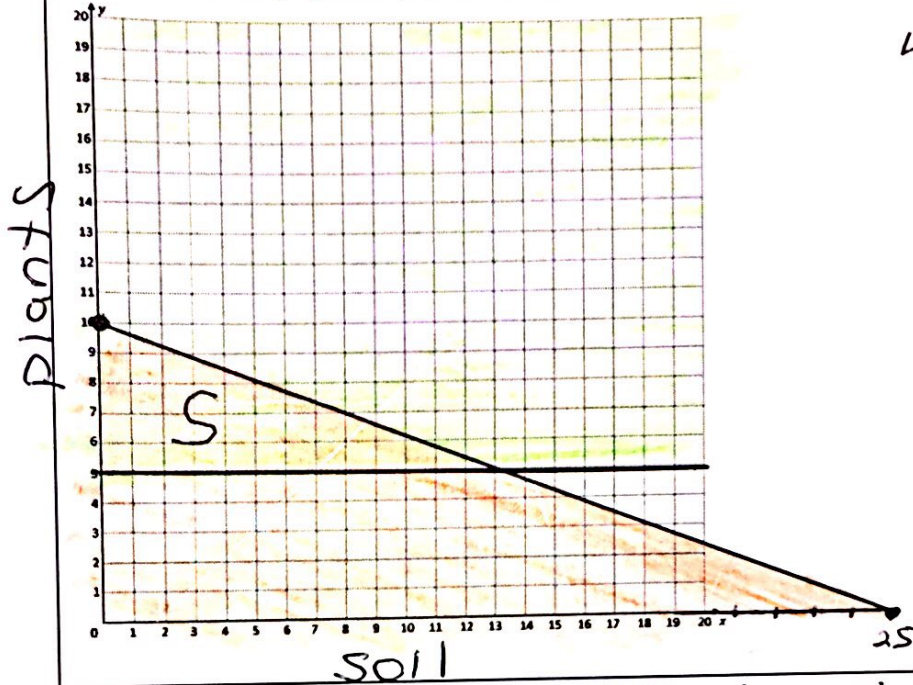




5. Marsha is buying plants and soil for her garden. The soil cost \$4 per bag, and the plants cost \$10 each. She wants to buy at least 5 plants and can spend no more than \$100. Write a system of linear inequalities to model the situation. Then graph the possible solutions. Label each axis.

$$4x + 10y \leq 100$$

$$y \geq 5$$



6. You can work at most 20 hours next week. You need to earn at least \$92 to cover you weekly expenses. Your dog-walking job pays \$7.50 per hour and your job as a car wash attendant pays \$6 per hour. Write a system of linear inequalities to model the situation. Label each axis.

$$7.50x + 6y \geq 92$$

$$x + y \leq 20$$

