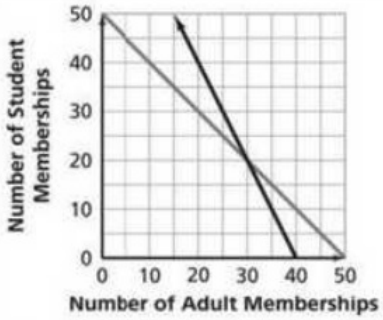
It's in the System

Day	Topic	Homework	IXL	Grade
1	Intro Day	Worksheet 1		
2	Inv 1.1	Worksheet 2		
3	Inv 1.2	Worksheet 3		
4	Inv 1.3 (start)	Worksheet 4	AA1	
5	Inv 1.3 (finish)	Study for Quiz	AA2	
6	Quiz	Worksheet 5	AA4	
7	Inv 2.1 (start)	Worksheet 6	AA8	
8	Inv 2.1 (finish)/Inv 2.2 (start)	Worksheet 7	AA10	
9	Inv 2.2 (finish)/Inv 2.3 (start)	Worksheet 8	X1	
10	Inv 2.3 (finish)	Study for Quiz	X2	
11	Quiz	Worksheet 9	X3	
12	Solving Inequalities Part I	Worksheet 10	X4	
13	Solving Inequalities Part II	Worksheet 11	X6	
14	Practice	Review Packet	X8	
15	Review	Study for Test	X9	
16	Test	None		

Name: _____

Important Concepts	Examples
Solving Linear Equations Students have used tables or graphs to find solutions. They can solve simple linear equations, $y = mx + b$ or $mx + b = nx + c$, and simple equations with parentheses, $y = a(x + b)$. In this Unit, students solve equations for different variables symbolically, writing equivalent forms of the equation.	$12x + 3y = 9$ $3y = -12x + 9$ (1) Subtract $12x$ from each side of the equation. $y = -4x + 3$ (2) Divide each side of the equation by 3. $12x + 3y = 9$ $4x + y = 3$ (1) Divide each side of the equation by 3. $y = 3 - 4x$ (2) Subtract $4x$ from each side of the equation. $y = -4x + 3$ (3) Rearrange the order of terms.
Solving Linear Inequalities Solving an inequality is very similar to solving a linear equation. The rules for operations with inequalities are identical to those for equations, with one exception. When multiplying (or dividing) an inequality by a negative number, you must reverse the direction of the inequality sign.	$5x + 7 \leq 42$ $5x \leq 35$ $x \leq 7$ Solving this inequality is similar to solving $5x + 7 = 42$. The operations $(+, -, \times, \div)$ are applied to each side of the inequality. You usually show this solution on a number line.  $-5x + 7 \leq 42$ $-5x \leq 35$ $x \geq -7$ Reverse the direction of the inequality sign. 
Solving Systems of Linear Equations There are three standard methods for solving a system of linear equations. The **graphing method** involves producing straight-line graphs for each equation and then reading coordinates of intersection points as the solution(s). The **linear combination method** relies on two basic principles: (1) If one of the equations is replaced by a new equation formed by adding the two original equations, the solution is unchanged. (2) The solutions of any linear equation $Ax + By = C$ are the same as the solutions of $KAx + KBy = KC$, where K is a nonzero number. The **equivalent form method** is the process of rewriting the equations in $y = ax + b$ form and then setting the two expressions for y equal to each other.	 The intersection point has coordinates (30, 20), so the solution of the system is $x = 30$ and $y = 20$. $\begin{cases} 3x + 5y = 8 \\ 6x + y = 7 \end{cases}$ is equivalent to $\begin{cases} -6x - 10y = -16 \\ 6x + y = 7 \end{cases}$ Adding the two equations gives $-9y = -9$. The solution is $y = 1$ and $x = 1$. $\begin{cases} 2x + y = 5 \\ 9x - 3y = 15 \end{cases}$ is equivalent to $\begin{cases} y = -2x + 5 \\ y = 3x - 5 \end{cases}$ Since $y = y$, $-2x + 5 = 3x - 5$. The solution is $x = 2$ and $y = 1$.

Profit = Income − Expenses

Name ..... Date ..... Class .....

Labsheet 1.1A Fundraiser Sales

Shirt = $5 profit
Cap = $10

A)1) 15 shirts, 10 caps

5 × 15 = $75
10 × 10 = $100
100 + 75 = $175

2) 12 shirts, 20 caps

12 × 5 = 60
20 × 10 = 200
200 + 60 = $260

3) 30 shirts, 50 caps

30 · 5 = 150
50 × 10 = 500
150 + 500 = $650

4) s shirts, c caps

5s + 10c

B)1) make \$600 exactly

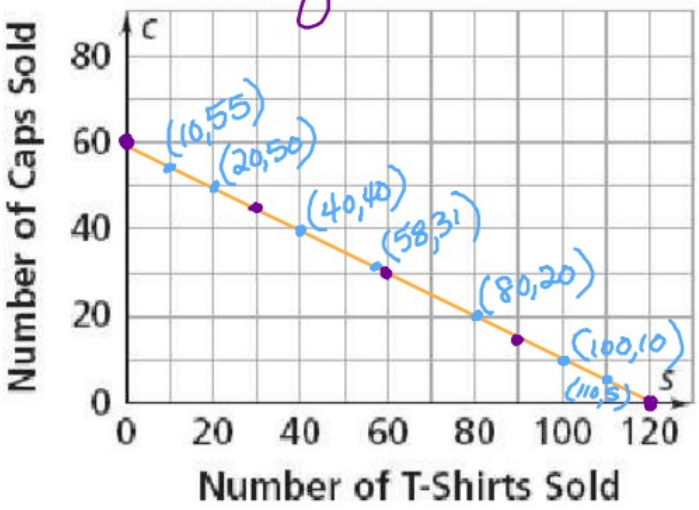
$\frac{600}{10} = 60$ $\frac{600}{5} = 120$

No. of Shirts	0	10	20	30	40	50	60	70	80	90	100	110	120
No. of Caps	60	55	50	45	40	35	30	25	20	15	10	5	0

2)

$5S + 10C$

$5(10) + 10(55) = 600$



$5(110) + 10(5) = 600$

3) (10,55) (110,5) (70,25)

Shirts caps

$5(10) + 10(55) = 600$

$5(70) + 10(25) = 600$

4) The coordinates would change places but they still represent the same solutions for the situation.

x	0	5	10
y	10	5	0

x	0	-2	-4
y	2	1	0

Name ..... Date ..... Class .....

Labsheet 1.1B Question C

$x+y=10$

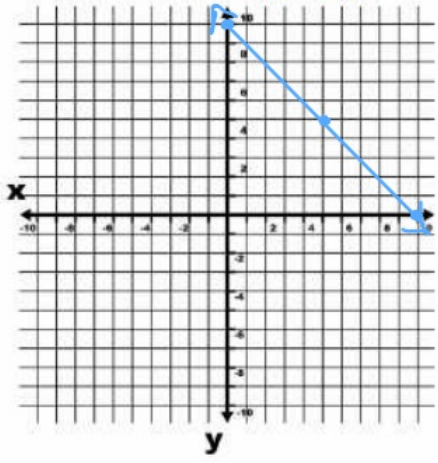
$x-2y=-4$

$-2y=-4$

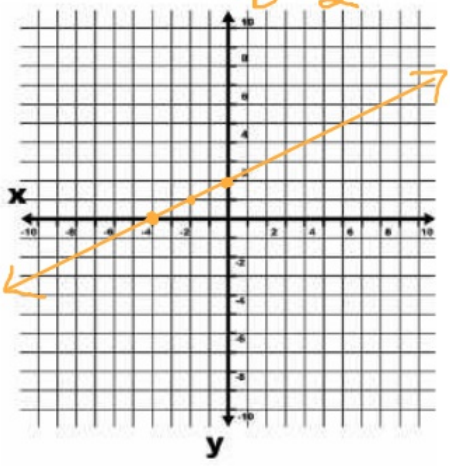
$-2y=-x-4$

$x=-4$

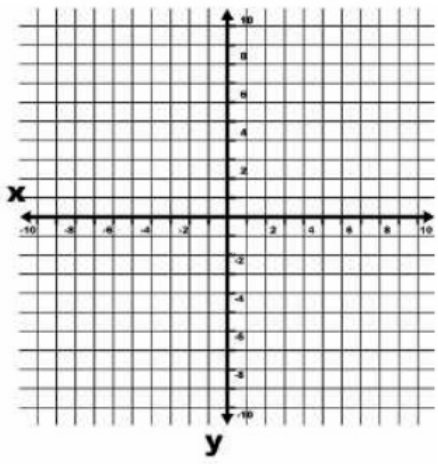
1. $y = -x + 10$ $m=-1$ $b=10$



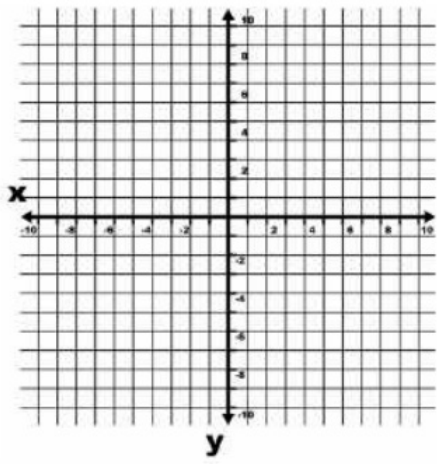
2. $y = 0.5x + 2$ $m=.5=\frac{1}{2}$ $b=2$



3. $-2x + y = 3$



4. $y = 1.5x - 2$



D)

$Ax+By=C$ Standard Form

Name ..... Date ..... Class .....

Labsheet 1.2 Equivalent $y = mx + b$ Form — Slope-Intercept

Jared ✓

$12x + 3y = 9$

$-12x \quad -12x$

$\frac{3y}{3} = \frac{-12x + 9}{3}$ (1) Subtract 12x

$y = -4x + 3$ (2) divided by 3

Molly ✗

$12x + 3y = 9$

$3y = 9 - 12x$ (1) $-12x$

$y = 3 - 12x$ (2) $\div 3$ — Forgot to $\div 3$

$y = -12x + 3$

Mia ✓

$12x + 3y = 9$

$4x + y = 3$ (1) $\div 3$

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

$y = -4x + 3$ Commutative Property

Ali ✗

$12x + 3y = 9$

$3y = 9 - 12x$ (1)

$y = 3 - 4x$ (2)

$y = 4x - 3$ (3) applied Comm. Prop. wrong

B Write each equation in $y = mx + b$ form. Solve for y.

1. $x - y = 4$
2. $2x + y = 9$
3. $8x + 4y = -12$
4. $c = ax + dy$

(1) $x - y = 4$

$-x \quad -x$

$-y = -x + 4$

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

$y = x - 4$

$m = 1$

$b = -4$

(2) $2x + y = 9$

$-2x \quad -2x$

$y = -2x + 9$

$m = -2$

$b = 9$

(3) $8x + 4y = -12$

$-8x \quad -8x$

$\frac{4y}{4} = \frac{-8x - 12}{4}$

$y = -2x - 3$

$m = -2$

$b = -3$

C Write each equation in $Ax + By = C$ form. Standard

1. $y = 5 - 3x$
2. $y = \frac{3}{4}x + \frac{1}{4}$
3. $x = 2y - 3$
4. $fy + 3 = gx - 15$

(1) $y = 5 - 3x$

$+3x \quad +3x$

$3x + y = 5$

$m = -3$

$b = 5$

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

$-\frac{3}{4}x \quad -\frac{3}{4}x$

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

(3) $x = 2y - 3$

$-2y \quad -2y$

$x - 2y = -3$

D) 1)

Standard

$3x+5y=12$

$-3x \quad -3x$

$\frac{5y}{5} = \frac{-3x+12}{5}$

$y=-0.6x+2.4$

Slope-Intercept

$y=-4x+7$

$+4x \quad +4x$

$4x+y=7$

$-7=-4x-y$

2) Slope-Intercept

$m=-0.6$

$b=2.4$

$y=0 \Rightarrow \quad 3x+5(0)=12$

$\frac{3x}{3} = \frac{12}{3}$

$x=4$

x intercept

Standard

$m=-4$

$b=7$

$4x+y=7$

$\frac{4x}{4} = \frac{7}{4}$

$x=1.75$ x-int.

3)

Adult = $10
Student = $5

Name ..... Date ..... Class .....

50 memberships total
$400 total

Labsheet 1.3 Student/Adult Membership Graph

Let a = # of adult
Let S = # of student

A)

1) $10a + 5S = 400$

$\frac{400}{10} = 40$

$\frac{400}{5} = 80$

2)

a	0	20	40
S	80	40	0

$10(20) + 5(40) = 400$

3) $a + S = 50$

a	0	5	10	15	20	25	30	35	40
S	80	70	60	50	40	30	20	10	0

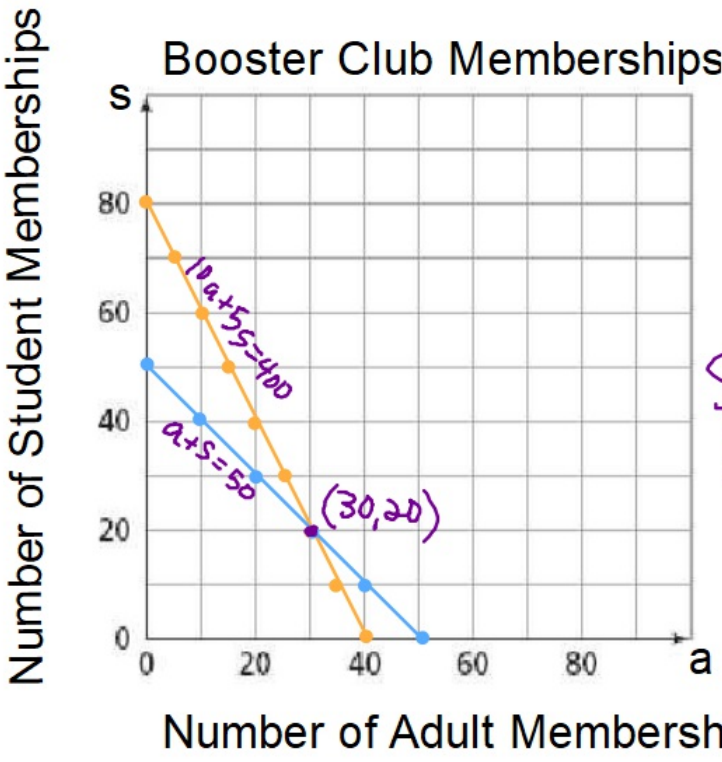
4)

a	0	10	20	25	30	40	50
S	50	40	30	25	20	10	0

5) 30 adult
20 student
(30, 20)

B)

1)



System of Equations

2) (30,20)

These were sold last night to get $400 from 50 new memberships.

30 adult memberships
20 student memberships

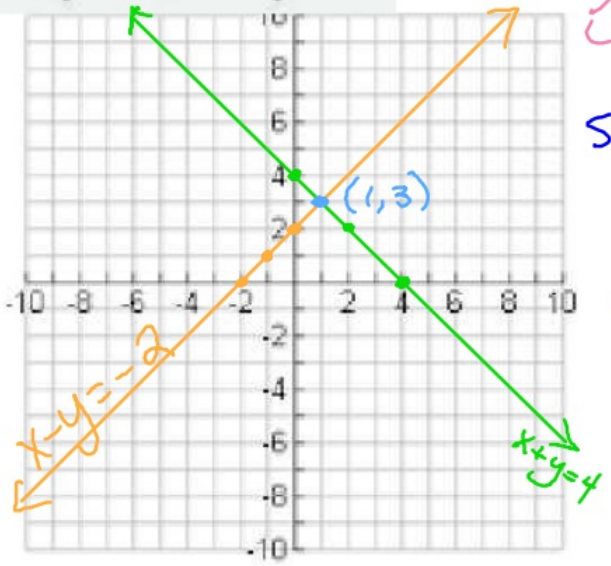
3)

4)

C Use graphic or symbolic methods to solve each system of linear equations. Check your answer.

1. $x + y = 4$ and $x - y = -2$
2. $2x + y = -1$ and $x - 2y = 7$
3. $-2x + y = 3$ and $-4x + 2y = 6$
4. $-2x + y = 3$ and $-4x + 2y = 10$

1. $x + y = 4$ and $x - y = -2$



System of equations (more than 1 equation on the same graph).

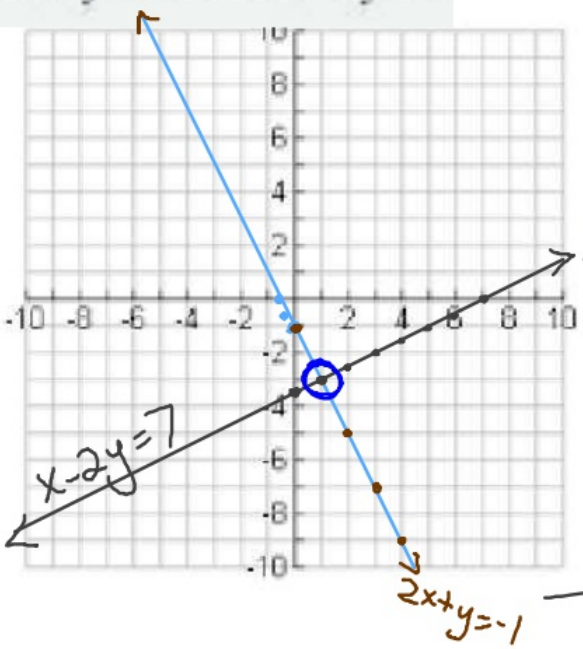
Solution is always the point where they cross.

x	0	2	4
y	4	2	0

Solution: (1,3)

x	0	-1	-2
y	2		0

2. $2x + y = -1$ and $x - 2y = 7$



x	0	$-\frac{1}{4}$	$-\frac{1}{2}$
y	-1	$-\frac{1}{2}$	0

$2x + y = -1$

$-2x \quad -2x$

$y = -2x - 1$

$m = -2$

$b = -1$

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

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

$x - 2y = 7$

$-x \quad -x$

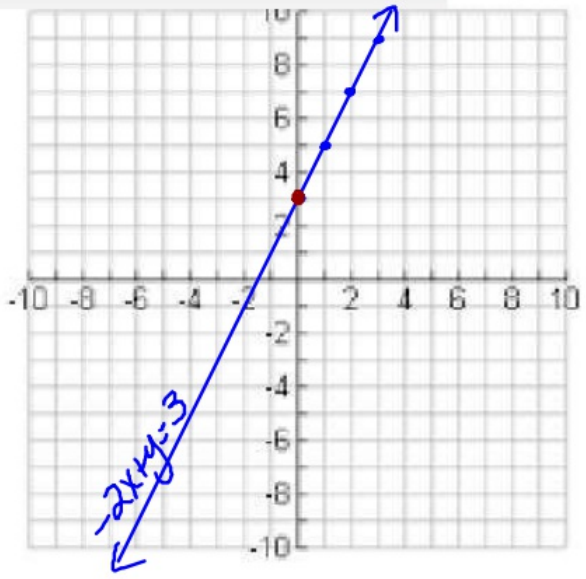
$\frac{-2y}{-2} = \frac{-x + 7}{-2}$

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

$.5x - 3.5$

Solution: (1,-3)

3. $-2x + y = 3$ and $-4x + 2y = 6$



$-2x+y=3$

$+2x \quad +2x$

$y = 2x+3$

$m = 2$

$b = 3$

$-4x+2y=6$

$+4x \quad +4x$

$2y = 4x+6$

$\frac{2y}{2} = \frac{4x+6}{2}$

$y = 2x+3$

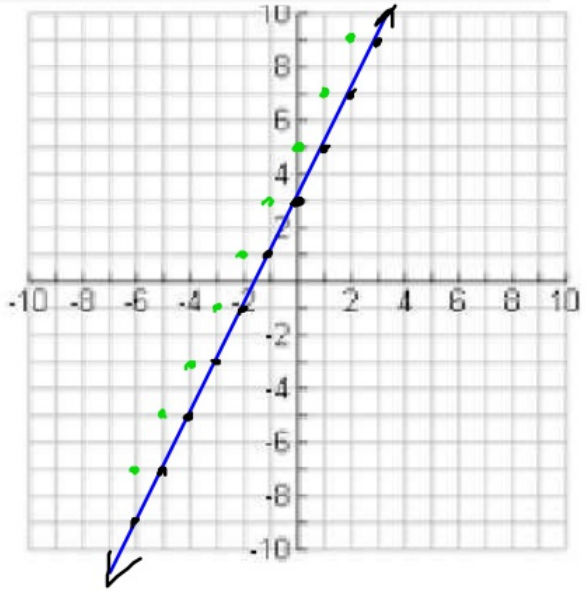
$m = 2$

$b = 3$

Same line

All points on the line are solutions to the system

4. $-2x + y = 3$ and $-4x + 2y = 10$



$-2x+y=3$

$+2x \quad +2x$

$y = 2x+3$

$m = 2$

$b = 3$

There is no solution

$-4x+2y=10$

$+4x \quad +4x$

$2y = 4x+10$

$\frac{2y}{2} = \frac{4x+10}{2}$

$y = 2x+5$

$m = 2$

$b = 5$

Problem 2.1 Shirts and Caps Again

Be sure you are reading in your book beginning on page 24.

A)

1) Do you understand Nyla's reasoning? Graph the two equations on the grid below.

Nyla

Write a system of two linear equations.

$$\begin{cases} c + s = 18 \\ 10c + 5s = 125 \end{cases}$$

Write equivalent equations.

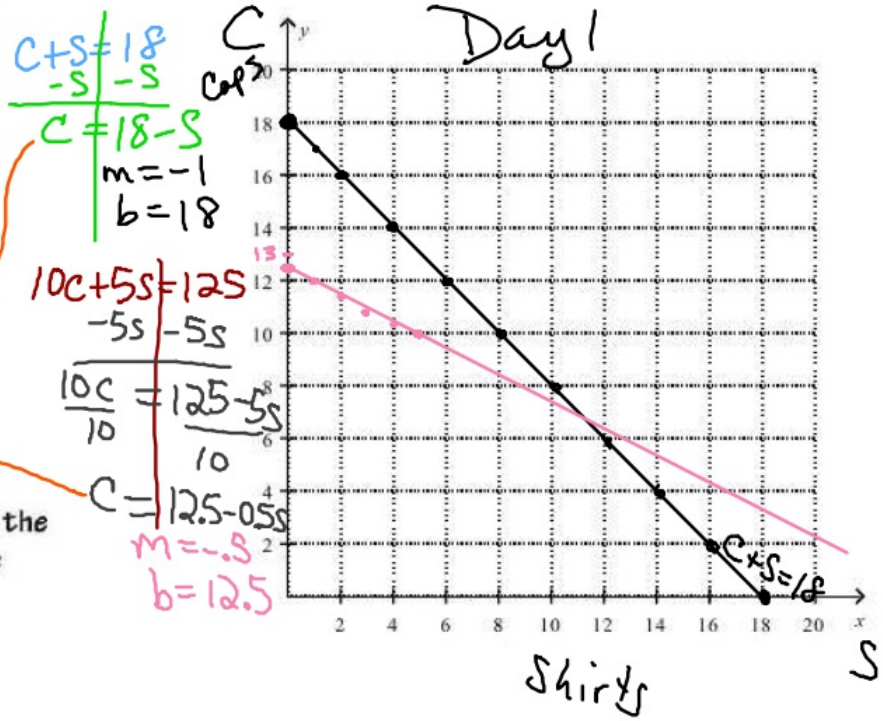
$$\begin{cases} c = 18 - s \\ c = \frac{1}{10}(125 - 5s) \text{ or} \end{cases}$$

$$\begin{cases} c = 18 - s \\ c = 12.5 - 0.5s \end{cases}$$

Graph the two equations. The solution of the system is the point where the graphs of the equations meet.

$C+S=18$
$-S \quad -S$
$C=18-S$
$m=-1$
$b=18$

$10C+5S=125$
$-5S \quad -5S$
$\frac{10C}{10} = \frac{125-5S}{10}$
$C=12.5-0.5S$
$m=-.5$
$b=12.5$



What is the solution to the system of equations based on Nyla's graph? (11,7)

$C+S=18$
$7+11=18$
$18=18$ ✓

11 shirts & 7 caps.

$10C+5S=125$
$10(7)+5(11)=125$
$125=125$ ✓

2) Do you understand Jimfa's reasoning? Finish solving the system according to his reasoning.

Jimfa

Write a system of two linear equations.

$$\begin{cases} c + s = 18 \\ 10c + 5s = 125 \end{cases}$$

Write equivalent equations.

$$\begin{cases} c = -s + 18 \\ c = -0.5s + 12.5 \end{cases}$$

$C = 18 - S$

Write one linear equation.

$-0.5s + 12.5 = -s + 18$

Solve the linear equation for s. Then find the related value of c.

$-0.5S + 12.5 = -S + 18$

$+S \qquad +S$

$.5S + 12.5 = 18$

$-12.5 \quad -12.5$

$\frac{.5S}{.5} = \frac{5.5}{.5}$

$S = 11$ shirts

$C = -S + 18$

$C = -11 + 18$

$C = 7$ caps

What is the solution to his system? 11 shirts 7 caps

What do you notice about the two solutions? the same

Why do you think this happened? Same system

B)

$1.5(4.5)-0.4=6.35$

1) $\begin{cases} y = 1.5x - 0.4 \\ y = 0.3x + 5 \end{cases}$

$0.3(4.5)+5=6.35$

$y=6.35$

$1.5x-0.4=0.3x+5$

$-0.3x \quad -0.3x$

$1.2x-0.4=5$

$+0.4 \quad +0.4$

$\frac{1.2x}{1.2}=\frac{5.4}{1.2}$

$x=4.5$

Solution

(4.5, 6.35)

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

*Solve both equations for same variable.

$x-y=-5$

$+y \quad +y$

$x=y-5$

$x=4-5$

$x=-1$

$x+y=3$

$-y \quad -y$

$x=-y+3$

$x=-4+3$

$x=-1$

$y-5=-y+3$

$+y \quad +y$

$2y-5=3$

$+5 \quad +5$

$\frac{2y}{2}=\frac{8}{2}$

$y=4$

Solution

(-1, 4)

3) $\begin{cases} 3x - y = 30 \\ x + y = 14 \end{cases}$

$3x - y = 30$
$-3x \quad -3x$
$-y = -3x + 30$
$y = 3x - 30$
$y = 3(11) - 30$
$y = 3$

$x + y = 14$
$-x \quad -x$
$y = -x + 14$
$y = -11 + 14$
$y = 3$

$3x - 30 = -x + 14$
$+x \quad +x$
$4x - 30 = 14$
$+30 \quad +30$
$\frac{4x}{4} = \frac{44}{4}$
$x = 11$

Solution
$(11, 3)$

4) $\begin{cases} x + 6y = 15 \\ -x + 4y = 5 \end{cases}$

$x + 6y = 15$
$-6y \quad -6y$
$x = -6y + 15$
$x = -6(2) + 15$
$x = 3$

$-x + 4y = 5$
$-4y \quad -4y$
$-x = -4y + 5$
$x = 4y - 5$
$x = 4(2) - 5$
$x = 3$

$-6y + 15 = 4y - 5$
$+6y \quad +6y$
$15 = 10y - 5$
$+5 \quad +5$
$\frac{20}{10} = \frac{10y}{10}$
$2 = y$

Solution
$(3, 2)$

5) $\begin{cases} x - y = -5 \\ -2x + 2y = 10 \end{cases}$

$x - y = -5$

$+y \quad +y$

$x = y - 5$

$y = x + 5$

$2y = 2x + 10$

$y = x + 5$

$-2x + 2y = 10$

$-2y \quad -2y$

$\frac{-2x}{-2} = \frac{-2y + 10}{-2}$

$x = y - 5$

Same line

All points on the line are a solution to the system

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

$x = y - 5$

$\frac{-2x}{-2} = \frac{-2y + 8}{-2}$

$x = y - 4$

$y - 5 = y - 4$

$-y \quad -y$

$-5 \neq -4$

parallel lines

no solution.

Mrs. Tennant ordered Mexican food from GrubHub for dinner last night. She thought that only she and Audra were going to be home for dinner so she ordered 4 tacos and 2 drinks for a total of $ 19.50. When her husband and son got home, they smelled the tacos and decided they wanted some. Mrs. Tennant placed another order through GrubHub - 6 tacos and 2 drinks for $ 27.50. How much did she pay for a taco? How much did she pay for a drink?

$$\begin{array}{r} 27.50 \\ -\ 19.50 \\ \hline 8 \end{array}$$

$$\frac{8}{2} = 4$$

1 taco = $4

$4 \cdot 4 = 16$

$$\begin{array}{r} 19.50 \\ -16 \\ \hline 3.5 \end{array}$$

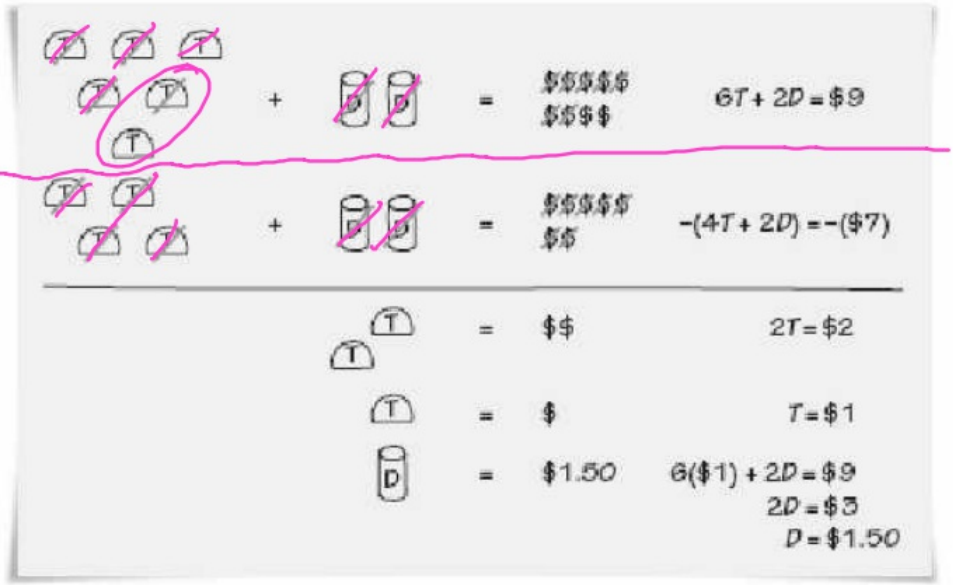
$$\frac{3.5}{2} = \$1.75$$

Problem 2.2 Tacos and Drinks

Student Strategies – Study the strategies and see if you can use them to solve the systems in part D

Represent the problem.

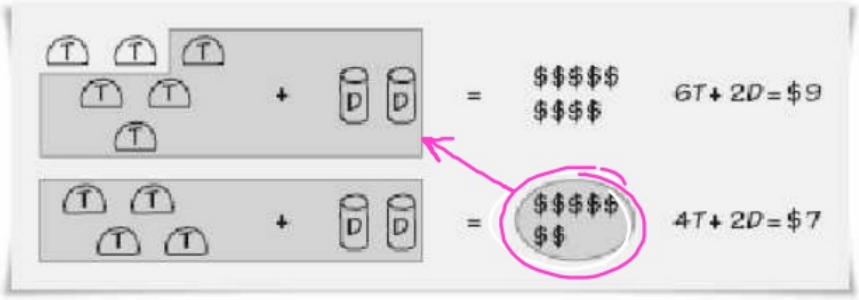
Combination Strategy I

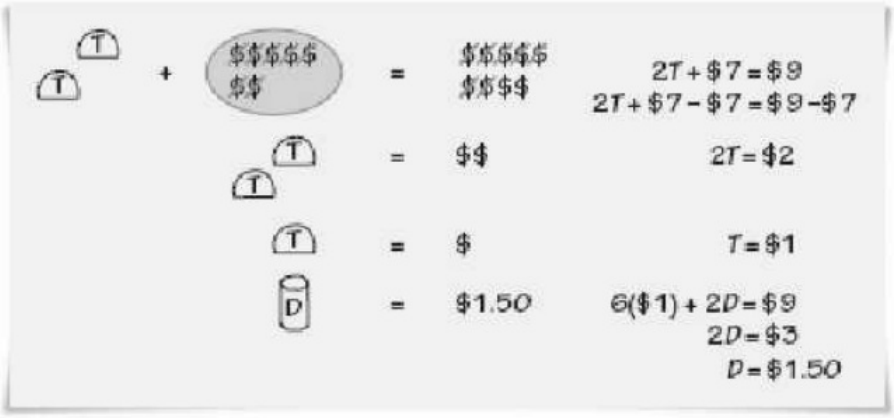


Problem 2.2 Tacos and Drinks

Represent the problem.

Combination Strategy II



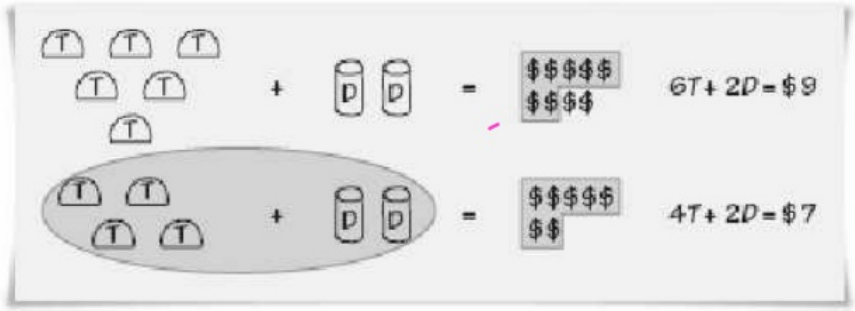


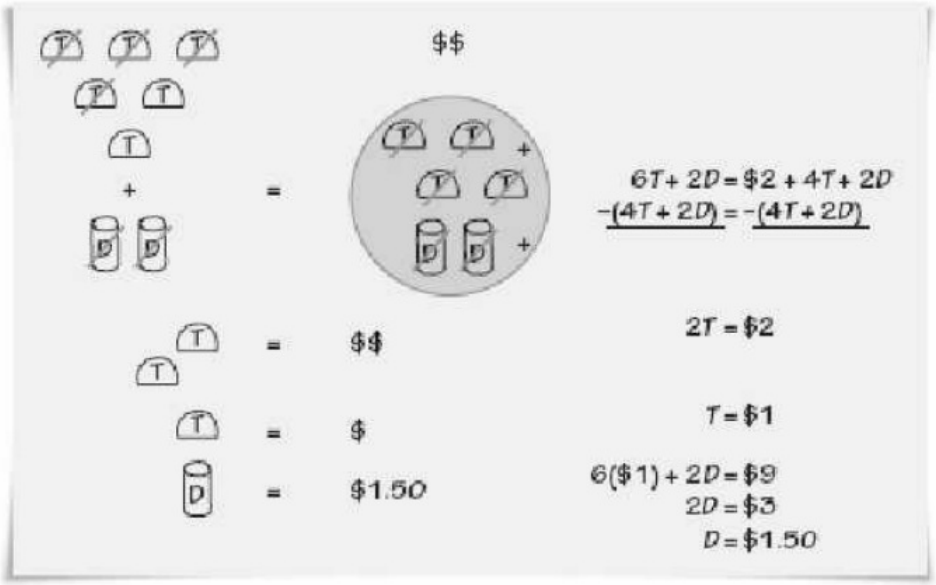
Problem 2.2

Tacos and Drinks

Represent the problem.

Combination Strategy III

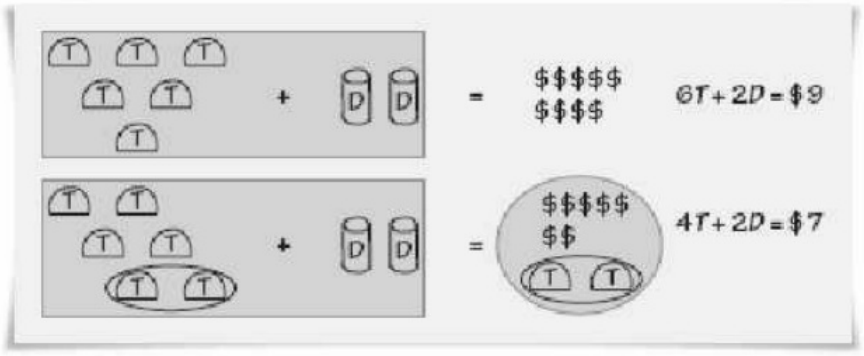


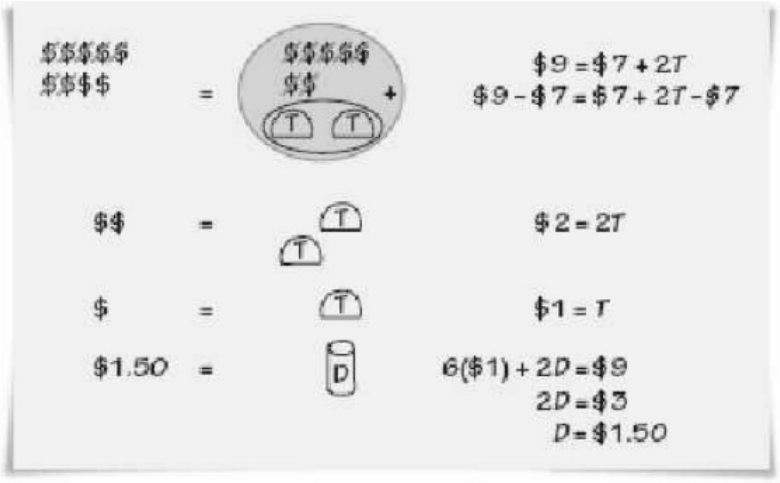


Problem 2.2 Tacos and Drinks

Represent the problem.

Combination Strategy IV





D) Solve the system.

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

$3x+y=4$
$-3x \quad -3x$
$y=-3x+4$
$y=-3(-\frac{1}{2})+4$
$y=5.5$

$x+y=5$
$-x \quad -x$
$y=-x+5$
$y=-(-\frac{1}{2})+5$
$y=5.5$

$-3x+4=-x+5$
$+x \quad +x$
$-2x+4=5$
$-4 \quad -4$
$-2x=1$
$\frac{-2x}{-2}=\frac{1}{-2}$
$x=-\frac{1}{2}$

Solution
$(-.5, 5.5)$

$\ominus$
$3x+y=4$
$x+y=5$
$2x=-1$
$\frac{2x}{2}=\frac{-1}{2}$
$x=-\frac{1}{2}$

$x+y=5$
$-\frac{1}{2}+y=5$
$+\frac{1}{2} \quad +\frac{1}{2}$
$y=5\frac{1}{2}$

Solution
$(-\frac{1}{2}, 5\frac{1}{2})$

$\ominus$ 2) $\begin{cases} 3x + 2y = 4 \\ x + 2y = 6 \end{cases}$

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

$x+2y=6$
$-1+2y=6$
$+1 \quad +1$
$2y=7$
$\frac{2y}{2}=\frac{7}{2}$
$y=3.5$

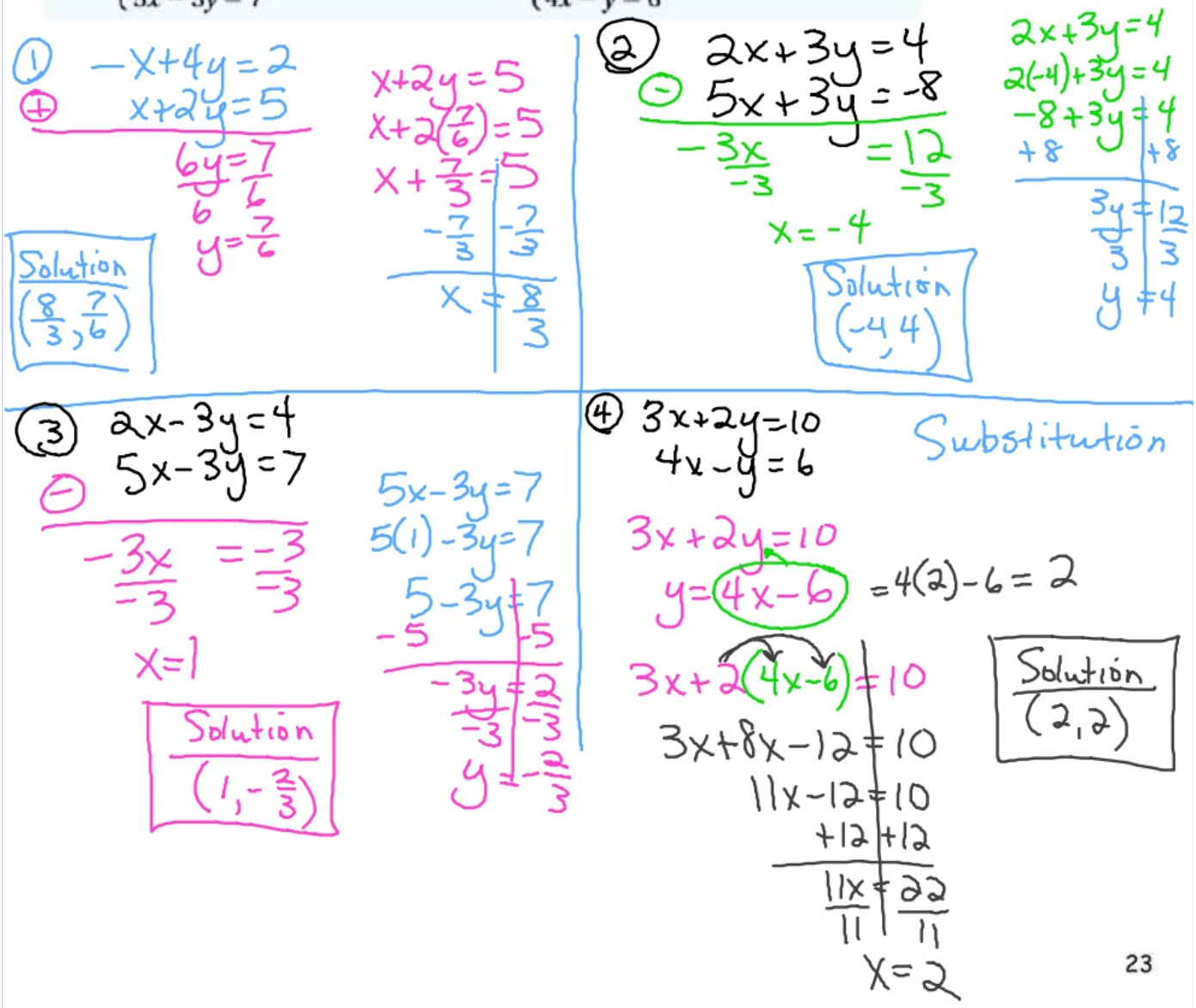
Solution
$(-1, 3.5)$

Problem 2.3 Solving Systems by Combining Equations II

A)

Use the methods of Pablo and Jasmine, and Samantha to solve each system.

1. $\begin{cases} -x + 4y = 2 \\ x + 2y = 5 \end{cases}$
2. $\begin{cases} 2x + 3y = 4 \\ 5x + 3y = -8 \end{cases}$
3. $\begin{cases} 2x - 3y = 4 \\ 5x - 3y = 7 \end{cases}$
4. $\begin{cases} 3x + 2y = 10 \\ 4x - y = 6 \end{cases}$



B) Skip this part.

C)

1. Is System B below equivalent to System A? Explain.

System A	System B
$\begin{cases} 3x + 2y = 10 \\ 4x - y = 6 \end{cases}$	$\begin{cases} 3x + 2y = 10 \\ 8x - 2y = 12 \end{cases}$

2. Use the combination method to solve System B.
3. Check that your solution also satisfies System A.

*In #3 check by substituting into both equations.

D)

1. $\begin{cases} 2x + 2y = 5 \\ 3x - 6y = 12 \end{cases}$
2. $\begin{cases} x + 3y = 4 \\ 4x + 5y = 2 \end{cases}$
3. $\begin{cases} 2x + y = 5 \\ 3x - 2y = 15 \end{cases}$
4. $\begin{cases} -x + 2y = 5 \\ 5x - 10y = 11 \end{cases}$

(3) $y = -2x + 5$ $= -2\left(\frac{25}{7}\right) + 5 = -\frac{15}{7}$

$3x - 2(-2x+5) = 15$

$3x + 4x - 10 = 15$

$7x - 10 = 15$

$+10 \quad +10$

$\frac{7x}{7} = \frac{25}{7}$

$x = \frac{25}{7}$

Solution $\left(\frac{25}{7}, -\frac{15}{7}\right)$

Solving Inequalities Part I

Solve and check.

1) $2x + 9 = 11$

$-9 \quad -9$

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

$x = 1$

$2x+9=11$

$2(1)+9=11$

$11=11$ ✓

2) $\frac{x}{9} - 1 = -4$

$+1 \quad +1$

$9 \cdot \frac{x}{9} = -3 \cdot 9$

$x = -27$

$\frac{x}{9} - 1 = -4$

$\frac{-27}{9} - 1 = -4$

$-4 = -4$ ✓

3) $5x - 7 = 28$

$+7 \quad +7$

$\frac{5x}{5} = \frac{35}{5}$

$x = 7$

$5x - 7 = 28$

$5(7) - 7 = 28$

$28 = 28$ ✓

4) $\frac{x}{7} + 4 = 8$

$-4 \quad -4$

$7 \cdot \frac{x}{7} = 4 \cdot 7$

$x = 28$

$\frac{x}{7} + 4 = 8$ $8 = 8$ ✓

$\frac{28}{7} + 4 = 8$

5) $8x + 12 = 5x$

$-8x \quad -8x$

$\frac{12}{-3} = \frac{-3x}{-3}$

$-4 = x$

$8x+12=5x$

$8(-4)+12=5(-4)$ $-20=-20$ ✓

6) $12 - 7x = 2x + 30$

$+7x \quad +7x$

$\frac{12}{9} = \frac{9x}{9} + \frac{30}{9}$

$-30 \quad -30$

$\frac{-18}{9} = \frac{9x}{9}$

$x = -2$

$12-7x=2x+30$

$12-7(-2)=2(-2)+30$

$26 = 26$ ✓

7) $5x + 2 - 8x + 11 = -5$

$-3x + 13 = -5$

$-13 \quad -13$

$\frac{-3x}{-3} = \frac{-18}{-3}$

$x = 6$

$5x+2-8x+11=-5$

$5(6)+2-8(6)+11=-5$

$-5=-5$ ✓

8) $7x - 9x + 2 = 14$

$-2x + 2 = 14$

$-2 \quad -2$

$-2x = 12$

$-2 \quad -2$

$x = -6$

$7x - 9x + 2 = 14$

$7(-6) - 9(-6) + 2 = 14$

$14 = 14$

9) $6(-2x - 8) = 60$

$-12x - 48 = 60$

$+48 \quad +48$

$-12x = 108$

$-12 \quad -12$

$x = -9$

$6[-2(-9) - 8] = 60$

$6(18 - 8) = 60$

$60 = 60$

10) $6(x + 9) = -12$

$6x + 54 = -12$

$-54 \quad -54$

$\frac{6x}{6} = \frac{-66}{6}$

$x = -11$

$6(x + 9) = -12$

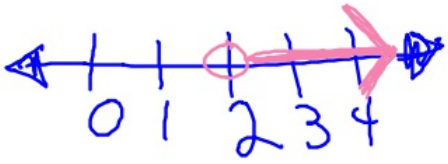
$6(-11 + 9 = -12)$

$-12 = 12$ ✓

Solving an inequality follows the same rules as solving an equation. Solve the inequality.

11) $\frac{8x}{8} > \frac{16}{8}$

$x > 2$



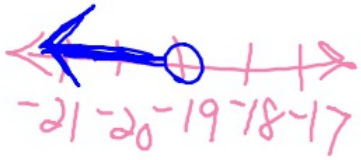
12) $2(x + 4) < -30$

$2x + 8 < -30$

$-8 \quad -8$

$\frac{2x}{2} < \frac{-38}{2}$

$x < -19$



$-19 < x$

Solving Inequalities Part II

Solve the Inequalities. Graph the solution on a number line.

1) $10x + 18 < -32$

2) $\frac{x}{9} \geq -2$

3) $-3x - 7 < 2$

What happened in #3

Insert >, <, or =.

4) 5 ___ 6
5) -2 ___ -9
6) 10 ___ -5
7) -2 ___ 12

RULE: (for inequalities only!!)

8) $-4-x>2x-10$

9) $-x-5+4x\leq -11$

10) $4-(2x+8)>16$