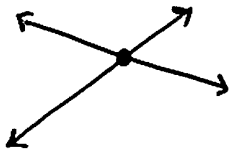
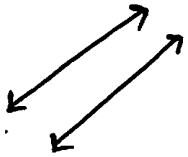
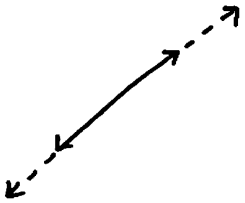
Name:	Date:
Topic:	Class:

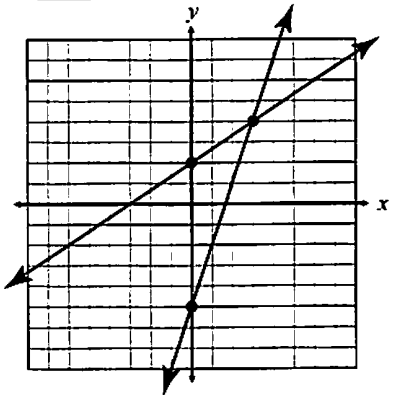
Main Ideas/Questions	Notes/Examples
SYSTEMS OF EQUATIONS	Two or more equations in the same variable
The **SOLUTION** *to a System*	**Graphically:** The point (x, y) where the two lines intersect. **Algebraically:** The point (x, y) that makes both equations true.

TYPES OF SOLUTIONS

INTERSECTING LINES	PARALLEL LINES	SAME LINE
		
ONE SOLUTION	**NO SOLUTION**	**INFINITE SOLUTION**
(x, y)	$\emptyset$	∞

EXAMPLES

Directions: Write the system of equations and identify the solution.

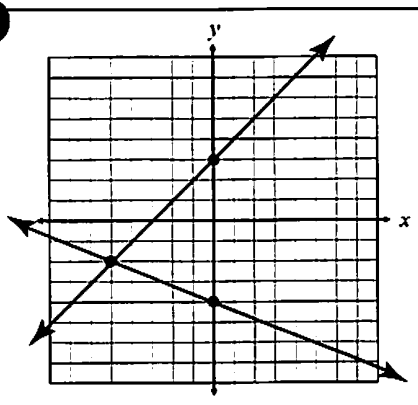
1. 

System of Equations:

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

$y = 3x - 5$

Solution: $(3, 4)$

2. 

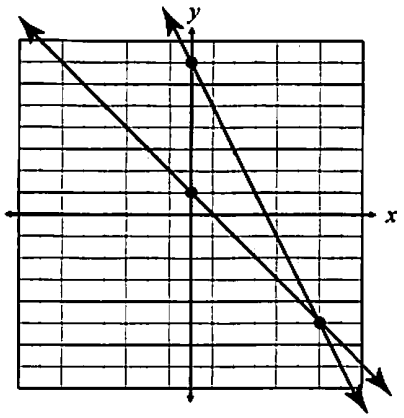
System of Equations:

$y = x + 3$

$y = -\frac{2}{5}x - 4$

Solution: $(-5, -2)$

3



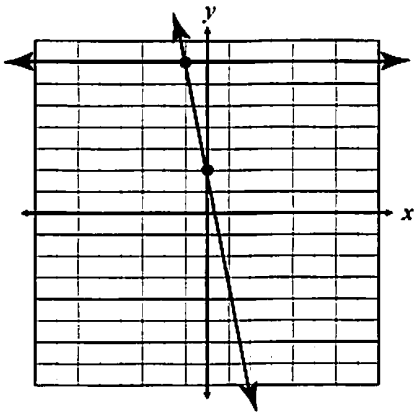
System of Equations:

$y = -x + 1$

$y = -2x + 7$

Solution: $(6, -5)$

4



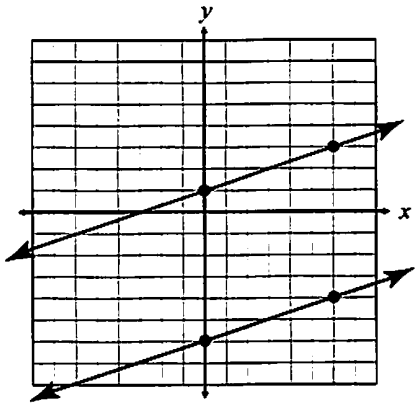
System of Equations:

$y = 7$

$y = -5x + 2$

Solution: $(-1, 7)$

5



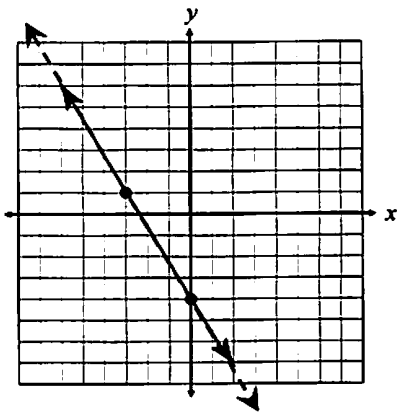
System of Equations:

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

$y = \frac{1}{3}x - 6$

Solution: $\emptyset$

6



System of Equations:

$y = -\frac{5}{3}x - 4$

$y = -\frac{5}{3}x - 4$

Solution: ∞

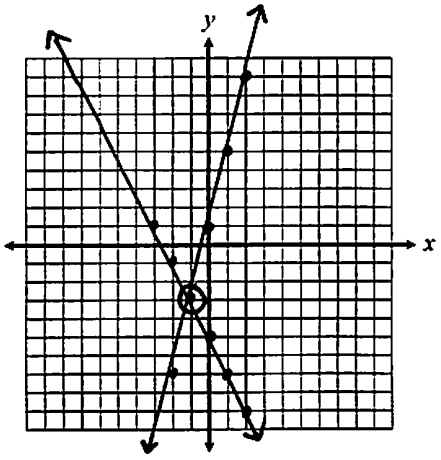
Name:	Date:
Topic:	Class:

Main Ideas/Questions	Notes/Examples
Solve a System by **GRAPHING**	1 Rewrite each equation in slope-intercept form. 2 Graph each line. 3 Identify the solution.

Examples

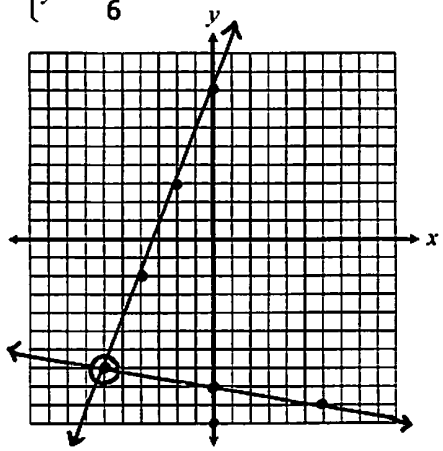
Directions: Solve the system of equations by graphing.

1. $\begin{cases} y = 4x + 1 \\ y = -2x - 5 \end{cases}$



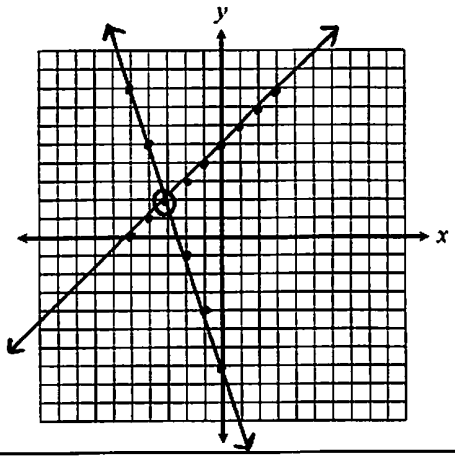
Solution: (-1, -3)

2. $\begin{cases} y = \frac{5}{2}x + 8 \\ y = -\frac{1}{6}x - 8 \end{cases}$



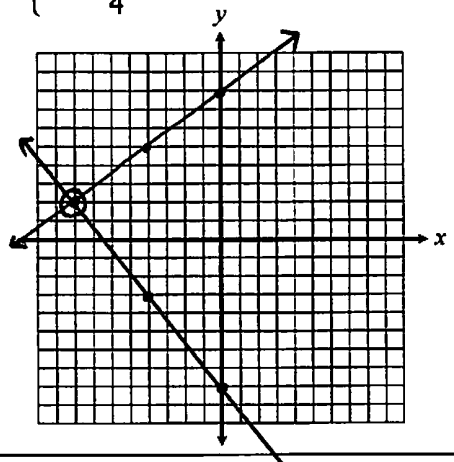
Solution: (-6, -7)

3. $\begin{cases} y = x + 5 \\ y = -3x - 7 \end{cases}$



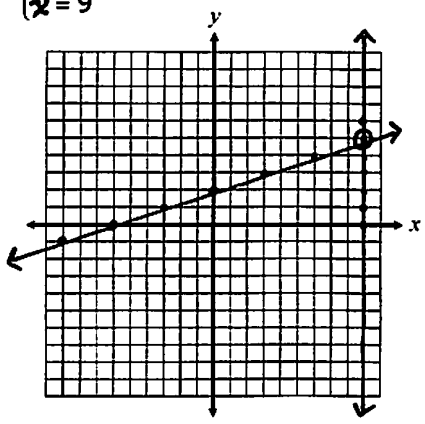
Solution: (-3, 2)

4. $\begin{cases} y = \frac{3}{4}x + 8 \\ y = -\frac{5}{4}x - 8 \end{cases}$



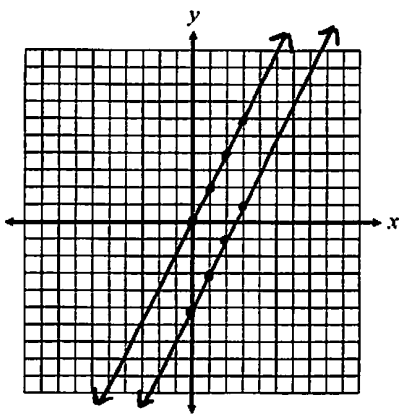
Solution: (-8, 2)

5. $\begin{cases} y = \frac{1}{3}x + 2 \\ x = 9 \end{cases}$



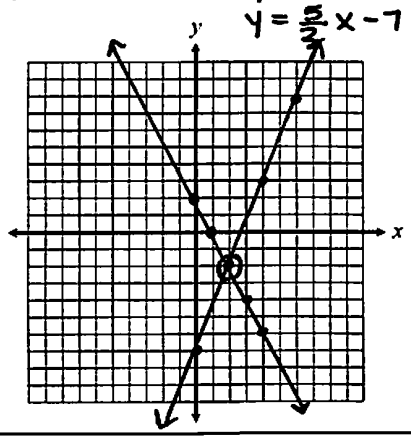
Solution: (9, 5)

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



Solution: ∅

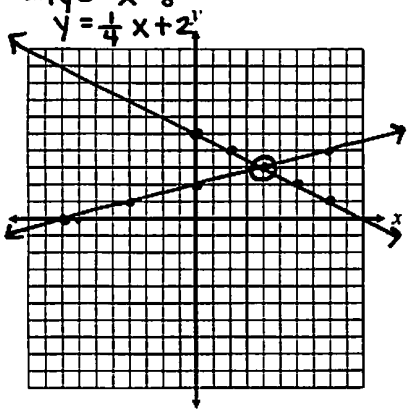
7. $\begin{cases} y = -2x + 2 \\ 5x - 2y = 14 \end{cases}$ → $-2y = -5x + 14$, $y = \frac{5}{2}x - 7$



Solution: (2, −2)

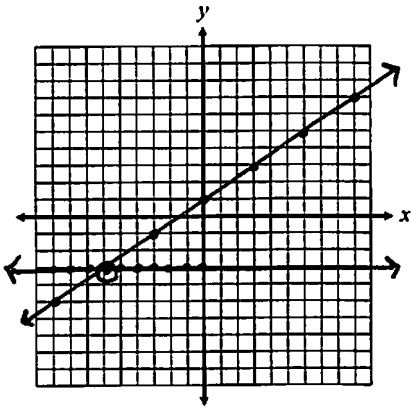
8. $\begin{cases} x + 2y = 10 \\ x - 4y = -8 \end{cases}$ → $2y = -x + 10$, $y = -\frac{1}{2}x + 5$

$-4y = -x - 8$, $y = \frac{1}{4}x + 2$



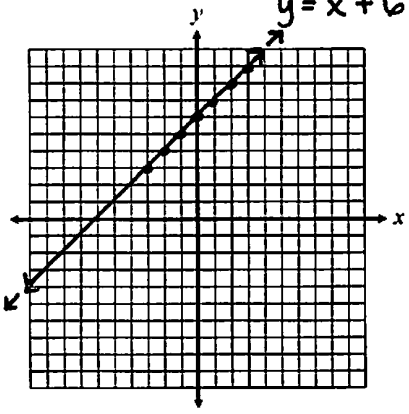
Solution: (4, 3)

9. $\begin{cases} 2x - 3y = -3 \\ y = -3 \end{cases}$ → $-3y = -2x - 3$, $y = \frac{2}{3}x + 1$



Solution: (−6, −3)

10. $\begin{cases} y = x + 6 \\ 2x - 2y = -12 \end{cases}$ → $-2y = -2x - 12$, $y = x + 6$



Solution: ∞

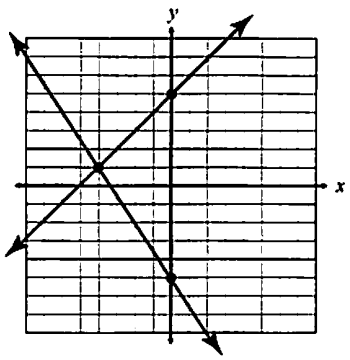
Name: _____ **Unit 6:** Systems of Equations

Date: _____ **Per:** _____ **Homework 1:** Solving Systems by Graphing

**** This is a 2-page document! ****

Directions: Write the system of equations shown on the graph and identify its solution.

1.

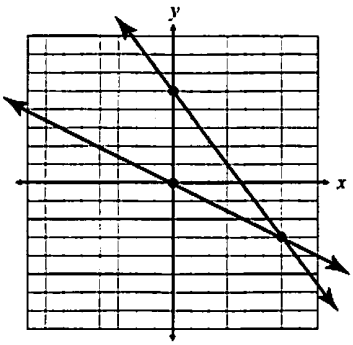


$y = x + 5$

$y = -\frac{3}{2}x - 5$

Solution: $(-4, 1)$

2.



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

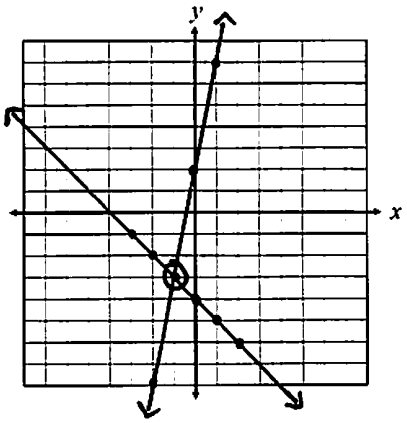
$y = -\frac{4}{3}x + 5$

Solution: $(6, -3)$

Directions: Solve each system by graphing. Be sure to clearly give the solution.

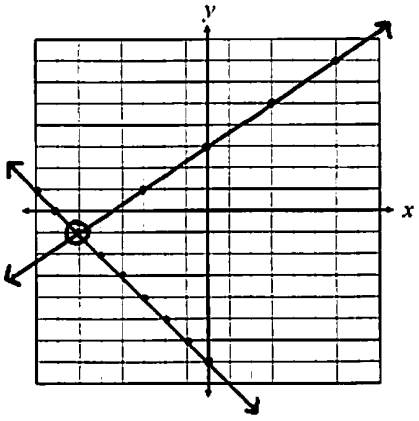
3. $\begin{cases} y = -x - 4 \\ y = 5x + 2 \end{cases}$

$(-1, -3)$



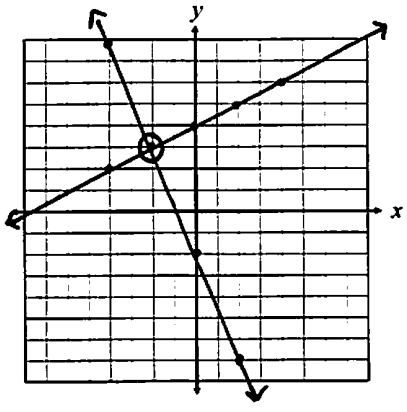
4. $\begin{cases} y = \frac{2}{3}x + 3 \\ y = -x - 7 \end{cases}$

$(-6, -1)$



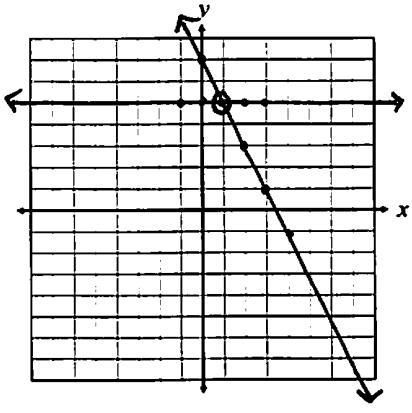
5. $\begin{cases} y = \frac{1}{2}x + 4 \\ y = -\frac{5}{2}x - 2 \end{cases}$

$(-2, 3)$

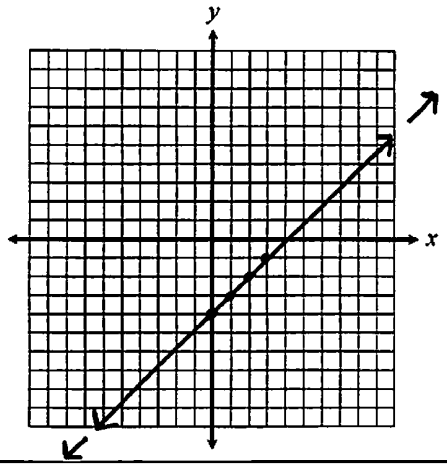


6. $\begin{cases} y = -2x + 7 \\ y = 5 \end{cases}$

$(1, 5)$

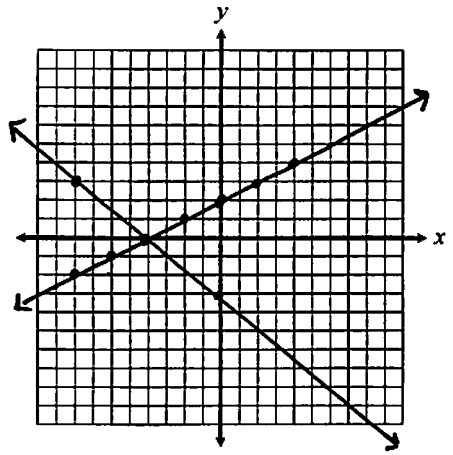


7. $\begin{cases} y = x - 4 \\ y = x - 4 \end{cases}$



∞

8. $\begin{cases} y = \frac{1}{2}x + 2 \\ y = -\frac{3}{4}x - 3 \end{cases}$

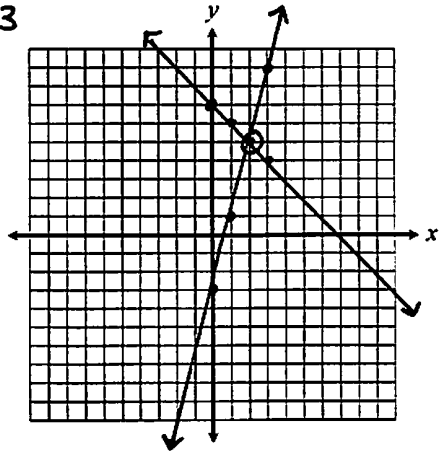


(-4, 0)

9. $\begin{cases} x + y = 7 \\ 4x - y = 3 \end{cases}$ → $y = -x + 7$

$-y = -4x + 3$

$y = 4x - 3$



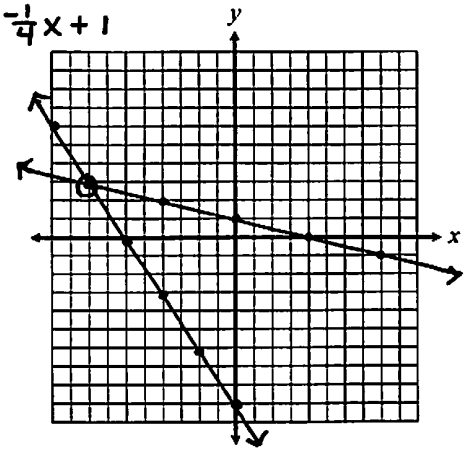
(2, 5)

10. $\begin{cases} 3x + 2y = -18 \\ x + 4y = 4 \end{cases}$ → $2y = -3x - 18$

$y = \frac{-3}{2}x - 9$

$4y = -x + 4$

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

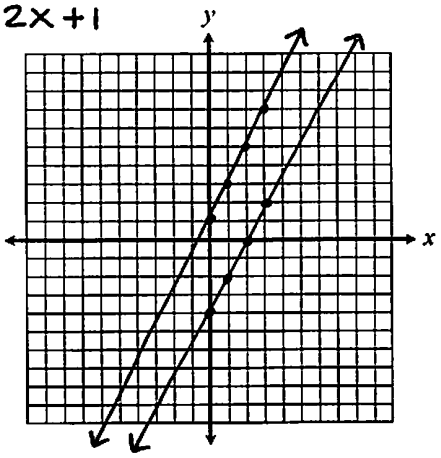


(-8, 3)

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

$-3y = -6x - 3$

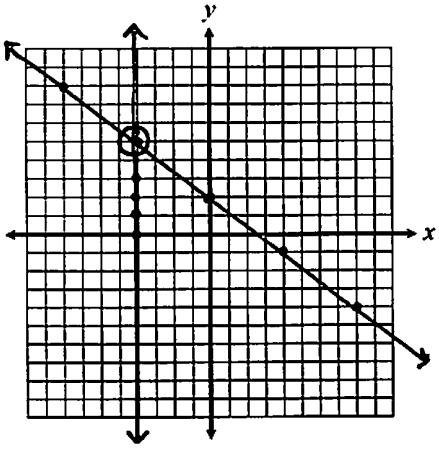
$y = 2x + 1$



∅

12. $\begin{cases} 3x + 4y = 8 \\ x = -4 \end{cases}$ → $4y = -3x + 8$

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



(-4, 5)

Name:	Date:
Topic:	Class:

Main Ideas/Questions	Notes/Examples
WARM-UP	**Directions:** Solve the following equations.

1. $3x+16=-5$

$-16 \quad -16$

$\frac{3x}{3}=\frac{-21}{3}$

$\boxed{x=-7}$

2. $x-27=7x-15$

$-x \quad -x$

$-27=6x-15$

$+15 \quad +15$

$\frac{-12}{6}=\frac{6x}{6}$

$\boxed{x=-2}$

3. $6x-(2x-9)=-31$

$6x-2x+9=-31$

$4x+9=-31$

$-9 \quad -9$

$\frac{4x}{4}=\frac{-40}{4}$

$\boxed{x=-10}$

4. $2x+8(x+3)=3(x-13)$

$2x+8x+24=3x-39$

$10x+24=3x-39$

$-3x \quad -3x$

$7x+24=-39$

$-24 \quad -24$

$7x=-63$

$\boxed{x=-9}$

Solving Systems by **SUBSTITUTION**	A method of solving systems of equations by substituting one equation into another.

Steps to Solve	
❶	Look for an equation that is solved for x or y.
❷	Substitute the expression into the other equation for that variable.
❸	Solve! Now you have one variable.
❹	Substitute your answer into either equation to find the other variable.
❺	Write your answer as an ordered pair, (x, y).

EXAMPLES

1. $\begin{cases} y=x-9 \\ y=4x-24 \end{cases}$

$x-9=4x-24$

$-x \quad -x$

$-9=3x-24$

$+24 \quad +24$

$\frac{15}{3}=\frac{3x}{3}$

$x=5$

$y=5-9$

$y=-4$

$\boxed{(5,-4)}$

2. $\begin{cases} y=-8x+14 \\ y=-5x+11 \end{cases}$

$-8x+14=-5x+11$

$+8x \quad +8x$

$14=3x+11$

$-11 \quad -11$

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

$x=1$

$y=-5(1)+11$

$y=6$

$\boxed{(1,6)}$

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

$-5x+4(-2x-8)=7$
$-5x-8x-32=7$
$-13x-32=7$
$-13x=39$
$x=-3$

$y=-2(-3)-8$
$y=6-8$
$y=-2$

$(-3,-2)$

4. $\begin{cases} y=-4x-23 \\ -4x-3y=13 \end{cases}$

$-4x-3(-4x-23)=13$
$-4x+12x+69=13$
$8x+69=13$
$8x=-56$
$x=-7$

$y=-4(-7)-23$
$y=28-23$
$y=5$

$(-7,5)$

5. $\begin{cases} y=-4 \\ 3x-5y=23 \end{cases}$

$3x-5(-4)=23$
$3x+20=23$
$3x=3$
$x=1$

$(1,-4)$

6. $\begin{cases} 7x-y=23 \\ y=4x-11 \end{cases}$

$7x-(4x-11)=23$
$7x-4x+11=23$
$3x+11=23$
$3x=12$
$x=4$

$y=4(4)-11$
$y=16-11$
$y=5$

$(4,5)$

7. $\begin{cases} 4x-9y=-48 \\ x=-3 \end{cases}$

$4(-3)-9y=-48$
$-12-9y=-48$
$-9y=-36$
$y=4$

$(-3,4)$

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

$-x-(-x+4)=1$
$-x+x-4=1$
$-4 \neq 1$

$\emptyset$

(The lines are parallel.)

9. $\begin{cases} y=x-8 \\ 2x-2y=16 \end{cases}$

$2x-2(x-8)=16$
$2x-2x+16=16$
$16=16$

∞

(The lines are the same.)

What do you get when you Cross a Fish with an Elephant?

Directions: Solve each system of equations by **substitution**. Show all work on a separate sheet of paper. Find matching answers between the columns. One will have a letter and the other a number. Write the letter in the matching numbered box at the bottom of the page.

COLUMN 1			COLUMN 2		
M.	$\begin{cases} y = 2x + 7 \\ y = -7x - 11 \end{cases}$	$(-2, 3)$	**7.**	$\begin{cases} y = -9x + 14 \\ y = x - 6 \end{cases}$	$(2, -4)$
T.	$\begin{cases} y = 4x + 25 \\ y = -2x + 1 \end{cases}$	$(-4, 9)$	**10.**	$\begin{cases} y = 2x - 2 \\ y = 4 \end{cases}$	$(3, 4)$
W.	$\begin{cases} y = 6x - 1 \\ y = 8x - 3 \end{cases}$	$(1, 5)$	**3.**	$\begin{cases} y = -4x - 29 \\ y = -x - 11 \end{cases}$	$(-6, -5)$
N.	$\begin{cases} y = -10x + 16 \\ y = -7x + 10 \end{cases}$	$(2, -4)$	**9.**	$\begin{cases} y = 1 - 2x \\ y = -7x - 19 \end{cases}$	$(-4, 9)$
K.	$\begin{cases} y = -9x - 16 \\ y = 6x - 1 \end{cases}$	$(-1, -7)$	**11.**	$\begin{cases} y = 2x - 20 \\ y = -3x + 10 \end{cases}$	$(6, -8)$
I.	$\begin{cases} y = -2x - 17 \\ x = -6 \end{cases}$	$(-6, -5)$	**8.**	$\begin{cases} y = -5x - 10 \\ y = 4x + 8 \end{cases}$	$(-2, 0)$
R.	$\begin{cases} y = 7x - 17 \\ 3x - y = 5 \end{cases}$	$(3, 4)$	**2.**	$\begin{cases} y = 9x - 4 \\ 8x - 5y = -17 \end{cases}$	$(1, 5)$
S.	$\begin{cases} y = -4x - 5 \\ 8x + 2y = 7 \end{cases}$	$\varnothing$	**14.**	$\begin{cases} 2x + 9y = 21 \\ y = 8x + 27 \end{cases}$	$(-3, 3)$
G.	$\begin{cases} -2x - y = 4 \\ y = 6x + 12 \end{cases}$	$(-2, 0)$	**6.**	$\begin{cases} y = x - 7 \\ 4x - 4y = 28 \end{cases}$	∞
M.	$\begin{cases} 3x + 7y = 1 \\ y = -5x - 9 \end{cases}$	$(-2, 1)$	**13.**	$\begin{cases} x - y = 6 \\ y = 8x + 1 \end{cases}$	$(-1, -7)$
S.	$\begin{cases} y = -8x - 21 \\ 4x - 3y = -21 \end{cases}$	$(-3, 3)$	**4.**	$\begin{cases} y = -9x - 17 \\ 3x - 6y = -12 \end{cases}$	$(-2, 1)$
I.	$\begin{cases} 6x - 2y = -8 \\ y = 3x + 4 \end{cases}$	∞	**5.**	$\begin{cases} -9x + 2y = 24 \\ y = -5x - 7 \end{cases}$	$(-2, 3)$
N.	$\begin{cases} y = 2x \\ 6x + 3y = -12 \end{cases}$	$(-1, -2)$	**1.**	$\begin{cases} 4x - 2y = 6 \\ y = 2x - 9 \end{cases}$	$\varnothing$
U.	$\begin{cases} -4x - y = -16 \\ y = 2x - 20 \end{cases}$	$(6, -8)$	**12.**	$\begin{cases} -8x + 7y = -6 \\ y = 7x + 5 \end{cases}$	$(-1, -2)$

ANSWER:

1.	2.	3.	4.	5.	6.	7.	8.		9.	10.	11.	12.	13.	14.	
S	W	I	M	M	I	N	G		T	R	U	N	K	S	!

Name: _____ **Unit 6:** Systems of Equations

Date: _____ **Per:** _____ **Homework 2:** Solving Systems by Substitution (Day 1)

**** This is a 2-page document! ****

Directions: Solve each system of equations by substitution.

1. $\begin{cases} y = 4x + 13 \\ y = 6x + 19 \end{cases}$

$4x+13=6x+19$
$13=2x+19$
$-6=2x$
$-3=x$
$y=4(-3)+13$
$y=-12+13$
$y=1$

$(-3,1)$

2. $\begin{cases} y = -3x + 20 \\ y = -2x + 12 \end{cases}$

$-3x+20=-2x+12$
$20=x+12$
$8=x$
$y=-2(8)+12$
$y=-16+12$
$y=-4$

$(8,-4)$

3. $\begin{cases} y = -5x - 19 \\ y = 5x + 1 \end{cases}$

$-5x-19=5x+1$
$-19=10x+1$
$-20=10x$
$-2=x$
$y=5(-2)+1$
$y=-10+1$
$y=-9$

$(-2,-9)$

4. $\begin{cases} y = -4 \\ y = -2x - 20 \end{cases}$

$-4=-2x-20$
$16=-2x$
$-8=x$

$(-8,-4)$

5. $\begin{cases} y = 4x - 29 \\ x + y = 1 \end{cases}$

$x+4x-29=1$
$5x-29=1$
$5x=30$
$x=6$
$y=4(6)-29$
$y=24-29$
$y=-5$

$(6,-5)$

6. $\begin{cases} y = 10x + 2 \\ -5x + 4y = -27 \end{cases}$

$-5x+4(10x+2)=-27$
$-5x+40x+8=-27$
$35x+8=-27$
$35x=-35$
$x=-1$
$y=10(-1)+2$
$y=-10+2$
$y=-8$

$(-1,-8)$

7. $\begin{cases} -6x - y = 23 \\ y = 4x + 7 \end{cases}$

$-6x-(4x+7)=23$

$-6x-4x-7=23$

$-10x-7=23$

$-10x=30$

$x=-3$

$y=4(-3)+7$

$y=-12+7$

$y=-5$

$(-3,-5)$

8. $\begin{cases} y = -6x + 19 \\ -x + 2y = 12 \end{cases}$

$-x+2(-6x+19)=12$

$-x-12x+38=12$

$-13x+38=12$

$-13x=-26$

$x=2$

$y=-6(2)+19$

$y=-12+19$

$y=7$

$(2,7)$

9. $\begin{cases} x - y = 10 \\ y = 2x - 7 \end{cases}$

$x-(2x-7)=10$

$x-2x+7=10$

$-x+7=10$

$-x=3$

$x=-3$

$y=2(-3)-7$

$y=-6-7$

$y=-13$

$(-3,-13)$

10. $\begin{cases} x = -2 \\ -5x - 4y = -10 \end{cases}$

$-5(-2)-4y=-10$

$10-4y=-10$

$-4y=-20$

$y=5$

$(-2,5)$

11. $\begin{cases} 12x - 3y = -21 \\ y = 4x + 7 \end{cases}$

$12x-3(4x+7)=-21$

$12x-12x-21=-21$

$-21=-21$

∞

12. $\begin{cases} y = -5x + 4 \\ -10x - 2y = 12 \end{cases}$

$-10x-2(-5x+4)=12$

$-10x+10x-8=12$

$-8 \neq 12$

$\emptyset$

Name:	Date:
Topic:	Class:

Main Ideas/Questions	Notes/Examples

WARM-UP

1. Solve for y: $2x + y = 5$

$-2x \quad -2x$

$y = -2x + 5$

2. Solve for x: $x - 4y = 7$

$+4y \quad +4y$

$x = 4y + 7$

Substitution that requires ISOLATION

The first step to solve a system of equations by substitution is to look for an equation that is solved for x or y. If there is not an equation, you will need to create one!

EXAMPLES

Directions: Solve each system of equations using substitution.

1. $\begin{cases} -3x + y = 8 \\ 8x - 3y = -19 \end{cases}$ $\rightarrow y = 3x + 8$

$8x - 3(3x + 8) = -19$

$8x - 9x - 24 = -19$

$-x - 24 = -19$

$-x = 5$

$x = -5$

$y = 3(-5) + 8$

$y = -15 + 8$

$y = -7$

$(-5, -7)$

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

$-x - 2(-4x + 1) = -16$

$-x + 8x - 2 = -16$

$7x - 2 = -16$

$7x = -14$

$x = -2$

$y = -4(-2) + 1$

$y = 8 + 1$

$y = 9$

$(-2, 9)$

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

$-y = -5x + 6$

$y = 5x - 6$

$2x + 4(5x - 6) = -2$

$2x + 20x - 24 = -2$

$22x - 24 = -2$

$22x = 22$

$x = 1$

$y = 5(1) - 6$

$y = 5 - 6$

$y = -1$

$(1, -1)$

4. $\begin{cases} 3x + y = -14 \\ 9x + 3y = -42 \end{cases}$ $\rightarrow y = -3x - 14$

$9x + 3(-3x - 14) = -42$

$9x - 9x - 42 = -42$

$-42 = -42$

∞

5. $\begin{cases} x+2y=-18 \\ 8x-7y=17 \end{cases}$ → $x=-2y-18$

$8(-2y-18)-7y=17$
$-16y-144-7y=17$
$-23y-144=17$
$-23y=161$
$y=-7$

$x=-2(-7)-18$
$x=14-18$
$x=-4$

$(-4,-7)$

6. $\begin{cases} 3x+2y=20 \\ x-7y=22 \end{cases}$

$x=7y+22$

$3(7y+22)+2y=20$
$21y+66+2y=20$
$23y+66=20$
$23y=-46$
$y=-2$

$x=7(-2)+22$
$x=-14+22$
$x=8$

$(8,-2)$

7. $\begin{cases} 3x-12y=-6 \\ x-4y=-8 \end{cases}$

$x=4y-8$

$3(4y-8)-12y=-6$
$12y-24-12y=-6$
$-24 \neq -6$

$\emptyset$

8. $\begin{cases} x-4y=-13 \\ x+9y=26 \end{cases}$

$x=-9y+26$

$-9y+26-4y=-13$
$-13y+26=-13$
$-13y=-39$
$y=3$

$x=-9(3)+26$
$x=-27+26$
$x=-1$

$(-1,3)$

9. $\begin{cases} 8x-7y=-21 \\ x+y=-12 \end{cases}$

$x=-y-12$

$8(-y-12)-7y=-21$
$-8y-96-7y=-21$
$-15y-96=-21$
$-15y=75$
$y=-5$

$x=-(-5)-12$
$x=5-12$
$x=-7$

$(-7,-5)$

10. $\begin{cases} x-y=11 \\ x-4y=29 \end{cases}$

$x=4y+29$

$4y+29-y=11$
$3y+29=11$
$3y=-18$
$y=-6$

$x=4(-6)+29$
$x=-24+29$
$x=5$

$(5,-6)$

Name: _____ **Unit 6:** Systems of Equations

Date: _____ **Per:** _____ **Homework 3:** Solving Systems by Substitution (Day 2)

**** This is a 2-page document! ****

Directions: Solve each system of equations by substitution.

1. $\begin{cases} 4x+y=1 \\ 5x-2y=-15 \end{cases}$ → $y=-4x+1$

$5x-2(-4x+1)=-15$
$5x+8x-2=-15$
$13x-2=-15$
$13x=-13$
$x=-1$

$y=-4(-1)+1$
$y=4+1$
$y=5$

$(-1,5)$

2. $\begin{cases} 3x+4y=-24 \\ 5x+y=-23 \end{cases}$ → $y=-5x-23$

$3x+4(-5x-23)=-24$
$3x-20x-92=-24$
$-17x-92=-24$
$-17x=68$
$x=-4$

$y=-5(-4)-23$
$y=20-23$
$y=-3$

$(-4,-3)$

3. $\begin{cases} 9x+2y=-14 \\ -7x+y=16 \end{cases}$ → $y=7x+16$

$9x+2(7x+16)=-14$
$9x+14x+32=-14$
$23x+32=-14$
$23x=-46$
$x=-2$

$y=7(-2)+16$
$y=-14+16$
$y=2$

$(-2,2)$

4. $\begin{cases} 3x-y=-27 \\ 2x+3y=4 \end{cases}$ → $y=3x+27$

$2x+3(3x+27)=4$
$2x+9x+81=4$
$11x+81=4$
$11x=-77$
$x=-7$

$y=3(-7)+27$
$y=-21+27$
$y=6$

$(-7,6)$

5. $\begin{cases} -2x+y=-1 \\ 4x-2y=2 \end{cases}$ → $y=2x-1$

$4x-2(2x-1)=2$
$4x-4x+2=2$
$2=2$

∞

6. $\begin{cases} x+y=10 \\ 4x-3y=12 \end{cases}$ → $x=-y+10$

$4(-y+10)-3y=12$
$-4y+40-3y=12$
$-7y+40=12$
$-7y=-28$
$y=4$

$x=-4+10$
$x=6$

$(6,4)$

7. $\begin{cases} x-5y=21 \\ 3x-4y=19 \end{cases}$ → $x = 5y + 21$

$3(5y+21) - 4y = 19$
$15y + 63 - 4y = 19$
$11y + 63 = 19$
$11y = -44$
$y = -4$

$x = 5(-4) + 21$
$x = -20 + 21$
$x = 1$

$(1, -4)$

8. $\begin{cases} 5x+2y=8 \\ x+3y=-14 \end{cases}$ → $x = -3y - 14$

$5(-3y-14) + 2y = 8$
$-15y - 70 + 2y = 8$
$-13y - 70 = 8$
$-13y = 78$
$y = -6$

$x = -3(-6) - 14$
$x = 18 - 14$
$x = 4$

$(4, -6)$

9. $\begin{cases} x+2y=2 \\ 5x+6y=22 \end{cases}$ → $x = -2y + 2$

$5(-2y+2) + 6y = 22$
$-10y + 10 + 6y = 22$
$-4y + 10 = 22$
$-4y = 12$
$y = -3$

$x = -2(-3) + 2$
$x = 6 + 2$
$x = 8$

$(8, -3)$

10. $\begin{cases} x-4y=15 \\ 3x-12y=12 \end{cases}$ → $x = 4y + 15$

$3(4y+15) - 12y = 12$
$12y + 45 - 12y = 12$
$45 \neq 12$

$\emptyset$

11. $\begin{cases} x-y=7 \\ 3x-7y=29 \end{cases}$ → $x = y + 7$

$3(y+7) - 7y = 29$
$3y + 21 - 7y = 29$
$-4y + 21 = 29$
$-4y = 8$
$y = -2$

$x = -2 + 7$
$x = 5$

$(5, -2)$

12. $\begin{cases} x-2y=22 \\ 2x+y=9 \end{cases}$ → $x = 2y + 22$

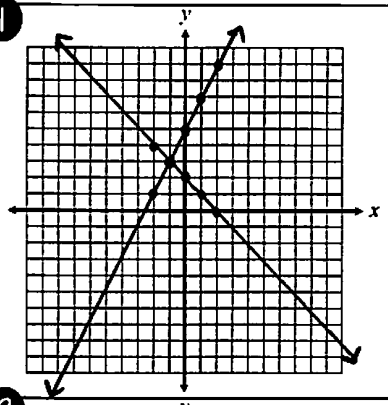
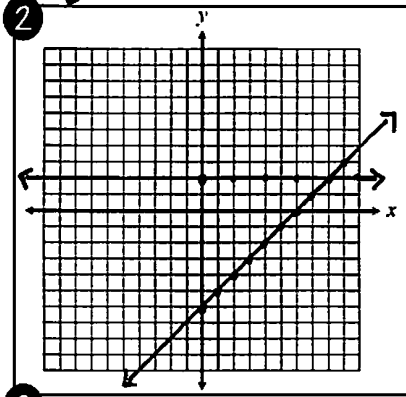
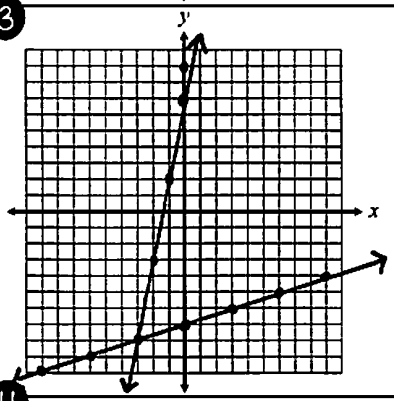
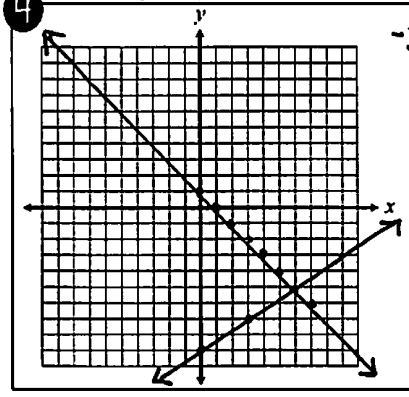
$2(2y+22) + y = 9$
$4y + 44 + y = 9$
$5y + 44 = 9$
$5y = -35$
$y = -7$

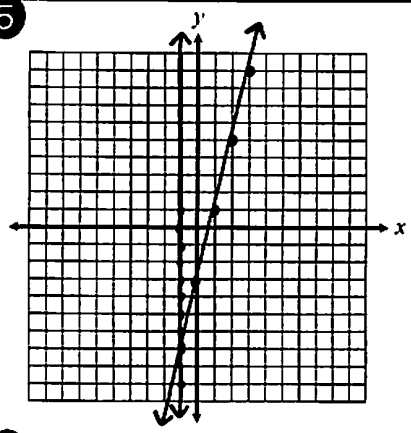
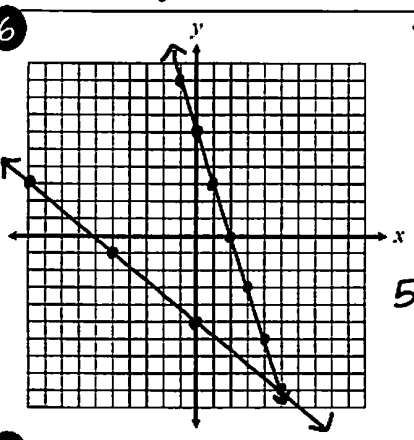
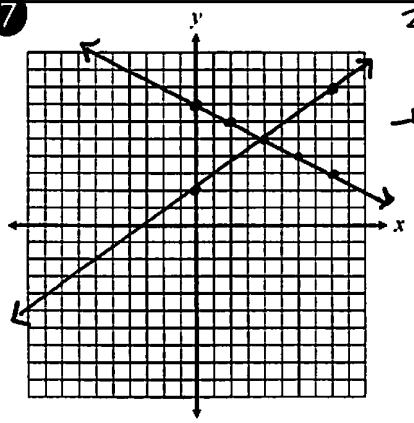
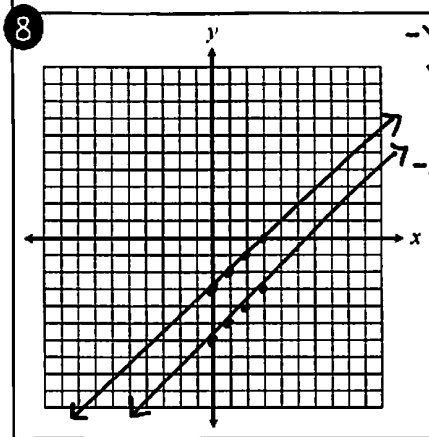
$x = 2(-7) + 22$
$x = -14 + 22$
$x = 8$

$(8, -7)$

GRAPHING vs. SUBSTITUTION

Directions: Solve each given system of equations by graphing and substitution.
If done correctly, your answers should be the same!

	Graphing Method	Substitution Method
1	 $\begin{cases} y = 2x + 5 \\ y = -x + 2 \end{cases}$ (-1, 3)	$2x+5 = -x+2$ $3x+5 = 2$ $3x = -3$ $x = -1$ $y = -(-1)+2$ $y = 1+2$ $y = 3$ (-1, 3)
2	 $\begin{cases} y = 2 \\ y = x - 6 \end{cases}$ (8, 2)	$2 = x-6$ $8 = x$ (8, 2)
3	 $-3y = -x+21$ $y = \frac{1}{3}x - 7$ $\begin{cases} x - 3y = 21 \\ y = 5x + 7 \end{cases}$ (-3, -8)	$x - 3(5x+7) = 21$ $x - 15x - 21 = 21$ $-14x - 21 = 21$ $-14x = 42$ $x = -3$ $y = 5(-3)+7$ $y = -15+7$ $y = -8$ (-3, -8)
4	 $-3y = -2x+27$ $y = \frac{2}{3}x - 9$ $\begin{cases} y = -x + 1 \\ 2x - 3y = 27 \end{cases}$ (6, -5)	$2x - 3(-x+1) = 27$ $2x + 3x - 3 = 27$ $5x - 3 = 27$ $5x = 30$ $x = 6$ $y = -6+1$ $y = -5$ (6, -5)

	Graphing Method	Substitution Method
5	 $y = 4x - 3$ $\begin{cases} -4x + y = -3 \\ x = -1 \end{cases}$ $(-1, -7)$	$-4(-1) + y = -3$ $4 + y = -3$ $y = -7$ $(-1, -7)$
6	 $y = -3x + 6$ $\begin{cases} 3x + y = 6 \\ 4x + 5y = -25 \end{cases}$ $5y = -4x - 25$ $y = -\frac{4}{5}x - 5$ $(5, -9)$	$4x + 5(-3x + 6) = -25$ $4x - 15x + 30 = -25$ $-11x + 30 = -25$ $-11x = -55$ $x = 5$ $y = -3(5) + 6$ $y = -15 + 6$ $y = -9$ $(5, -9)$
7	 $2y = -x + 14$ $y = -\frac{1}{2}x + 7$ $-4y = -3x - 8$ $y = \frac{3}{4}x + 2$ $\begin{cases} 3x - 4y = -8 \\ x + 2y = 14 \end{cases}$ $(4, 5)$	$3(-2y + 14) - 4y = -8$ $-6y + 42 - 4y = -8$ $-10y + 42 = -8$ $-10y = -50$ $y = 5$ $x = -2(5) + 14$ $x = -10 + 14$ $x = 4$ $(4, 5)$
8	 $-y = -x + 6$ $y = x - 6$ $-2y = -2x + 6$ $y = x - 3$ $\begin{cases} x - y = 6 \\ 2x - 2y = 6 \end{cases}$ $\emptyset$	$2x - 2(x - 6) = 6$ $2x - 2x + 12 = 6$ $12 \neq 6$ $\emptyset$

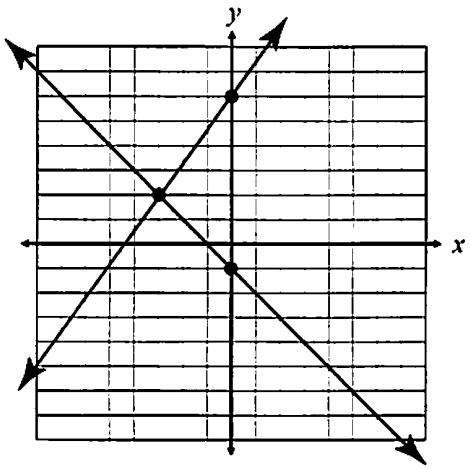
Name: _____ **Pre-Algebra**

Date: _____ **Per:** _____ **Unit 6:** Systems of Equations

Quiz 6-1: Solving Systems by Graphing and Substitution

Write the system of equations shown on the graph, then identify the solution.

1.

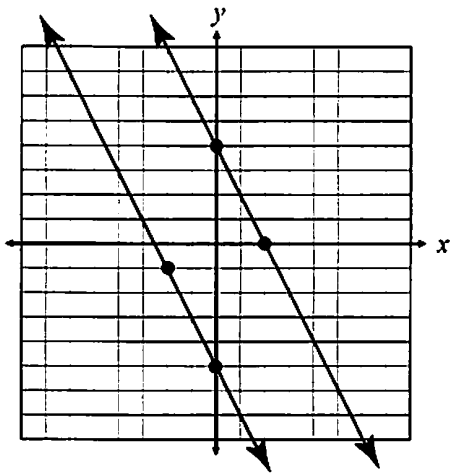


$y = \frac{4}{3}x + 6$

$y = -x - 1$

Solution: $(-3, 2)$

2.



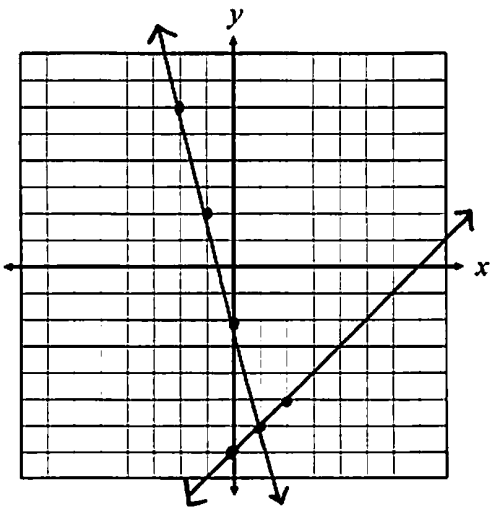
$y = -2x + 4$

$y = -2x - 5$

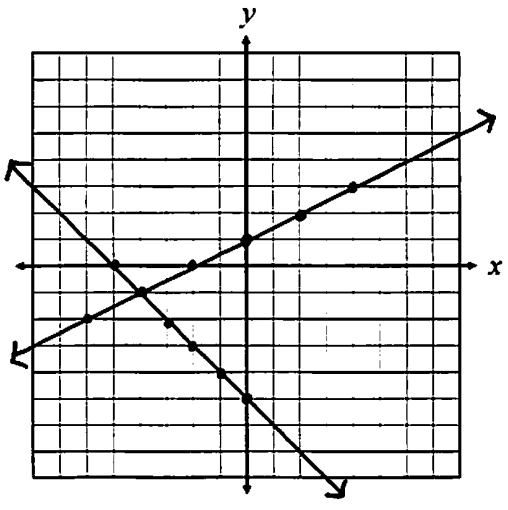
Solution: $\emptyset$

For questions 3-6, solve the system of equations by graphing.

3. $\begin{cases} y = x - 7 \\ y = -4x - 2 \end{cases}$



4. $\begin{cases} x - 2y = -2 \\ y = -x - 5 \end{cases}$ $\rightarrow -2y = -x - 2$, $y = \frac{1}{2}x + 1$

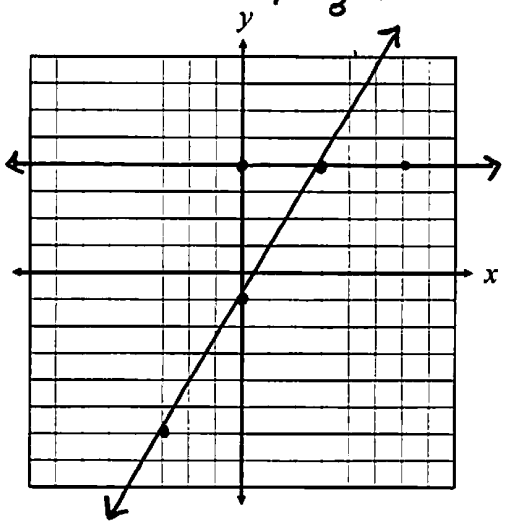


3. $(1, -6)$

4. $(-4, -1)$

5. $\begin{cases} y = 4 \\ 5x - 3y = 3 \end{cases}$ $-3y = -5x + 3$

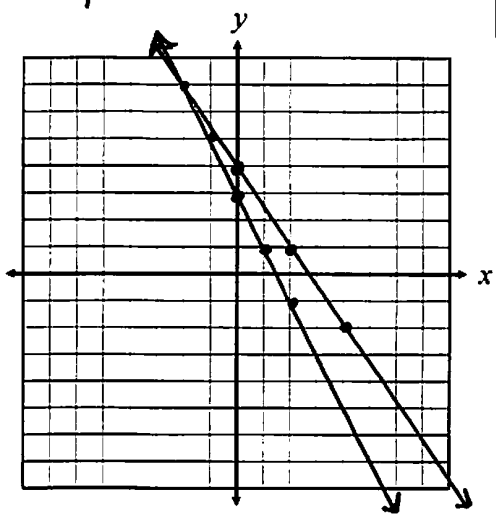
$y = \frac{5}{3}x - 1$



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

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

$y = -2x + 3$



5. (3, 4)

6. (-2, 7)

For questions 7-10, solve the system of equations by substitution.

7. $\begin{cases} y = 4x + 7 \\ y = -3x - 21 \end{cases}$

$4x + 7 = -3x - 21$

$7x + 7 = -21$

$7x = -28$

$x = -4$

$y = 4(-4) + 7$

$y = -16 + 7$

$y = -9$

8. $\begin{cases} x - y = 12 \\ y = -4x + 23 \end{cases}$

$x - (-4x + 23) = 12$

$5x - 23 = 12$

$5x = 35$

$x = 7$

$y = -4(7) + 23$

$y = -28 + 23$

$y = -5$

7. (-4, -9)

8. (7, -5)

9. (-1, -2)

10. ∞

9. $\begin{cases} -7x + y = 5 \\ 2x + 3y = -8 \end{cases}$ $\rightarrow$ $y = 7x + 5$

$2x + 3(7x + 5) = -8$

$2x + 21x + 15 = -8$

$23x + 15 = -8$

$23x = -23$

$x = -1$

$y = 7(-1) + 5$

$y = -7 + 5$

$y = -2$

10. $\begin{cases} x + 5y = -4 \\ 2x + 10y = -8 \end{cases}$ $\rightarrow$ $x = -5y - 4$

$2(-5y - 4) + 10y = -8$

$-10y - 8 + 10y = -8$

$-8 = -8$

Name:	Date:
Topic:	Class:

Main Ideas/Questions	Notes/Examples
Solving Systems by **ELIMINATION**	A method for solving systems of equations by subtracting the equations to eliminate a variable.
Steps to Solve	❶ Make sure the equations are lined up! ❷ Identify a variable that has the **same coefficient** on both equations. ❸ Subtract the equations to eliminate this variable. ❹ Solve the equation for the remaining variable. ❺ Substitute your answer into either equation to find the other variable. ❻ Write your answer as an ordered pair, (x, y).
EXAMPLES	1. $\begin{cases} y = 9x - 23 \\ y = x + 1 \end{cases}$ $0 = 8x - 24$ $24 = 8x$ $3 = x$ $y = 3 + 1$ $y = 4$ $(3, 4)$
	2. $\begin{cases} y = -7x + 5 \\ y = 4x - 6 \end{cases}$ $0 = -11x + 11$ $-11 = -11x$ $1 = x$ $y = 4(1) - 6$ $y = 4 - 6$ $y = -2$ $(1, -2)$
	3. $\begin{cases} y = 5x - 29 \\ y = -7x + 19 \end{cases}$ $0 = 12x - 48$ $48 = 12x$ $4 = x$ $y = 5(4) - 29$ $y = 20 - 29$ $y = -9$ $(4, -9)$
	4. $\begin{cases} y = -3x - 15 \\ y = -2x - 8 \end{cases}$ $0 = -x - 7$ $7 = -x$ $-7 = x$ $y = -2(-7) - 8$ $y = 14 - 8$ $y = 6$ $(-7, 6)$

5. $\begin{cases} x+y=3 \\ x-y=7 \end{cases}$

$2y=-4$

$y=-2$

$x-2=3$

$x=5$

$(5,-2)$

6. $\begin{cases} 7x-4y=-11 \\ 7x-10y=25 \end{cases}$

$6y=-36$

$y=-6$

$7x-4(-6)=-11$

$7x+24=-11$

$7x=-35$

$x=-5$

$(-5,-6)$

7. $\begin{cases} 4x-2y=-30 \\ -x-2y=5 \end{cases}$

$5x=-35$

$x=-7$

$-(-7)-2y=5$

$7-2y=5$

$-2y=-2$

$y=1$

$(-7,1)$

8. $\begin{cases} 5x+2y=-25 \\ 4x+2y=-18 \end{cases}$

$x=-7$

$5(-7)+2y=-25$

$-35+2y=-25$

$2y=10$

$y=5$

$(-7,5)$

9. $\begin{cases} 4x-y=-11 \\ 7x-y=-26 \end{cases}$

$-3x=15$

$x=-5$

$4(-5)-y=-11$

$-20-y=-11$

$-y=9$

$y=-9$

$(-5,-9)$

10. $\begin{cases} 3x+y=9 \\ 3x+y=-4 \end{cases}$

$0 \neq 13$

$\emptyset$

Name: _____ **Unit 6:** Systems of Equations

Date: _____ **Per:** _____ **Homework 4:** Solving Systems by Elimination (Day 1)

**** This is a 2-page document! ****

Directions: Solve each system of equations by elimination.

1. $\begin{cases} y = 3x + 13 \\ y = 7x + 17 \end{cases}$

$0 = -4x - 4$

$4 = -4x$

$-1 = x$

$y = 3(-1) + 13$

$y = -3 + 13$

$y = 10$

$(-1, 10)$

2. $\begin{cases} y = 4x - 15 \\ y = -2x - 3 \end{cases}$

$0 = 6x - 12$

$12 = 6x$

$2 = x$

$y = -2(2) - 3$

$y = -4 - 3$

$y = -7$

$(2, -7)$

3. $\begin{cases} y = -4x + 14 \\ y = 10x - 28 \end{cases}$

$0 = -14x + 42$

$-42 = -14x$

$3 = x$

$y = 10(3) - 28$

$y = 30 - 28$

$y = 2$

$(3, 2)$

4. $\begin{cases} y = -7x - 29 \\ y = -3x - 9 \end{cases}$

$0 = -4x - 20$

$20 = -4x$

$-5 = x$

$y = -7(-5) - 29$

$y = 35 - 29$

$y = 6$

$(-5, 6)$

5. $\begin{cases} x - y = -13 \\ x + y = -5 \end{cases}$

$-2y = -8$

$y = 4$

$x - 4 = -13$

$x = -9$

$(-9, 4)$

6. $\begin{cases} 2x - 9y = 17 \\ 2x + 3y = -19 \end{cases}$

$-12y = 36$

$y = -3$

$2x + 3(-3) = -19$

$2x - 9 = -19$

$2x = -10$

$x = -5$

$(-5, -3)$

7. $\begin{cases} 3x - y = 7 \\ 3x - y = 7 \end{cases}$

$0 = 0$

∞

8. $\begin{cases} -8x + y = 6 \\ -8x + 3y = -14 \end{cases}$

$-2y = 20$

$y = -10$

$-8x + (-10) = 6$

$-8x - 10 = 6$

$-8x = 16$

$x = -2$

$(-2, -10)$

9. $\begin{cases} 2x + y = -5 \\ 7x + y = -20 \end{cases}$

$-5x = 15$

$x = -3$

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

$-6 + y = -5$

$y = 1$

$(-3, 1)$

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

$-6x = 18$

$x = -3$

$2(-3) + 5y = -6$

$-6 + 5y = -6$

$5y = 0$

$y = 0$

$(-3, 0)$

11. $\begin{cases} 5x - y = 26 \\ 3x - y = 18 \end{cases}$

$2x = 8$

$x = 4$

$5(4) - y = 26$

$20 - y = 26$

$-y = 6$

$y = -6$

$(4, -6)$

12. $\begin{cases} 3x - 2y = 5 \\ 3x - 2y = 16 \end{cases}$

$0 \neq -11$

$\emptyset$

Name:	Date:
Topic:	Class:

Main Ideas/Questions	Notes/Examples
What if there are **NO COMMON COEFFICIENTS?**	Multiply one of the equations to make common coefficients, then subtract the equations and solve.
EXAMPLES	1. $\begin{cases} x-3y=2 \\ 4x+7y=27 \end{cases}$)4 → $4x-12y=8$ − $(4x+7y=27)$ → $-19y=-19$, $y=1$; $x-3(1)=2$, $x-3=2$, $x=5$; $\boxed{(5,1)}$
	2. $\begin{cases} 7x-2y=-32 \\ x-5y=-47 \end{cases}$ (7 → $7x-2y=-32$ − $(7x-35y=-329)$ → $33y=297$, $y=9$; $x-5(9)=-47$, $x-45=-47$, $x=-2$; $\boxed{(-2,9)}$
	3. $\begin{cases} 2x-5y=39 \\ 4x-3y=43 \end{cases}$)2 → $4x-10y=78$ − $(4x-3y=43)$ → $-7y=35$, $y=-5$; $2x-5(-5)=39$, $2x+25=39$, $2x=14$, $x=7$; $\boxed{(7,-5)}$
	4. $\begin{cases} 4x+y=-16 \\ 3x+2y=-17 \end{cases}$)2 → $8x+2y=-32$ − $(3x+2y=-17)$ → $5x=-15$, $x=-3$; $4(-3)+y=-16$, $-12+y=-16$, $y=-4$; $\boxed{(-3,-4)}$

5. $\begin{cases} -3x+5y=-24 \\ (2x+y=16)5 \end{cases}$ → $-3x+5y=-24$

$-(10x+5y=80)$

$-13x=-104$

$x=8$

$2(8)+y=16$

$16+y=16$

$y=0$

(8, 0)

6. $\begin{cases} 2x-3y=-20 \\ (7x-y=-13)3 \end{cases}$ → $2x-3y=-20$

$-(21x-3y=-39)$

$-19x=19$

$x=-1$

$2(-1)-3y=-20$

$-2-3y=-20$

$-3y=-18$

$y=6$

(-1, 6)

7. $\begin{cases} (2x+3y=1)3 \\ 5x+9y=-2 \end{cases}$ → $6x+9y=3$

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

$x=5$

$2(5)+3y=1$

$10+3y=1$

$3y=-9$

$y=-3$

(5, -3)

8. $\begin{cases} (2x-5y=-28)3 \\ 6x-y=-28 \end{cases}$ → $6x-15y=-84$

$-(6x-y=-28)$

$-14y=-56$

$y=4$

$6x-4=-28$

$6x=-24$

$x=-4$

(-4, 4)

9. $\begin{cases} 2x+4y=9 \\ (x+2y=15)2 \end{cases}$ → $2x+4y=9$

$-(2x+4y=30)$

$0\neq-21$

$\emptyset$

Name: _____ **Unit 6:** Systems of Equations

Date: _____ **Per:** _____ **Homework 5:** Solving Systems by Elimination (Day 2)

**** This is a 2-page document! ****

Directions: Solve each system of equations by elimination.

1. $\begin{cases} x+3y=-20 \\ 4x+5y=-38 \end{cases}$

$4x+12y=-80$
$-(4x+5y=-38)$
$7y=-42$
$y=-6$

$x+3(-6)=-20$
$x-18=-20$
$x=-2$

$(-2,-6)$

2. $\begin{cases} 2x-7y=9 \\ x+2y=10 \end{cases}$

$2x-7y=9$
$-(2x+4y=20)$
$-11y=-11$
$y=1$

$x+2(1)=10$
$x+2=10$
$x=8$

$(8,1)$

3. $\begin{cases} x+2y=-2 \\ 5x-3y=29 \end{cases}$

$5x+10y=-10$
$-(5x-3y=29)$
$13y=-39$
$y=-3$

$x+2(-3)=-2$
$x-6=-2$
$x=4$

$(4,-3)$

4. $\begin{cases} 3x-4y=1 \\ x-7y=23 \end{cases}$

$3x-4y=1$
$-(3x-21y=69)$
$17y=-68$
$y=-4$

$x-7(-4)=23$
$x+28=23$
$x=-5$

$(-5,-4)$

5. $\begin{cases} 2x+3y=25 \\ 8x+5y=37 \end{cases}$

$8x+12y=100$
$-(8x+5y=37)$
$7y=63$
$y=9$

$2x+3(9)=25$
$2x+27=25$
$2x=-2$
$x=-1$

$(-1,9)$

6. $\begin{cases} 5x-y=5 \\ 10x-2y=15 \end{cases}$

$10x-2y=10$
$-(10x-2y=15)$
$0\neq -5$

$\varnothing$

7. $\begin{cases} 5x+2y=-37 \\ 4x+y=-29 \end{cases}$

$5x+2y=-37$

$-(8x+2y=-58)$

$-3x=21$

$x=-7$

$4(-7)+y=-29$

$-28+y=-29$

$y=-1$

$(-7,-1)$

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

$-21x+7y=-56$

$-(2x+7y=-10)$

$-23x=-46$

$x=2$

$-3(2)+y=-8$

$-6+y=-8$

$y=-2$

$(2,-2)$

9. $\begin{cases} 2x-5y=-6 \\ 9x-y=-27 \end{cases}$

$2x-5y=-6$

$-(45x-5y=-135)$

$-43x=129$

$x=-3$

$9(-3)-y=-27$

$-27-y=-27$

$-y=0$

$y=0$

$(-3,0)$

10. $\begin{cases} 4x-y=-41 \\ 2x-3y=-33 \end{cases}$

$4x-y=-41$

$-(4x-6y=-66)$

$5y=25$

$y=5$

$4x-5=-41$

$4x=-36$

$x=-9$

$(-9,5)$

11. $\begin{cases} 3x+9y=24 \\ x+3y=8 \end{cases}$

$3x+9y=24$

$-(3x+9y=24)$

$0=0$

∞

12. $\begin{cases} 2x-6y=34 \\ 8x-3y=-11 \end{cases}$

$2x-6y=34$

$-(16x-6y=-22)$

$-14x=56$

$x=-4$

$2(-4)-6y=34$

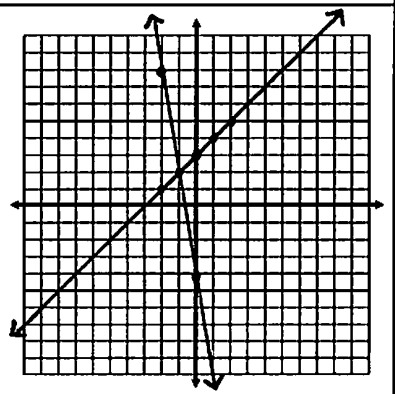
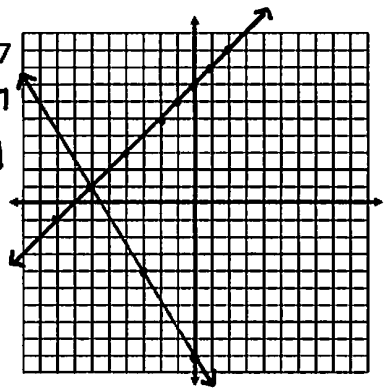
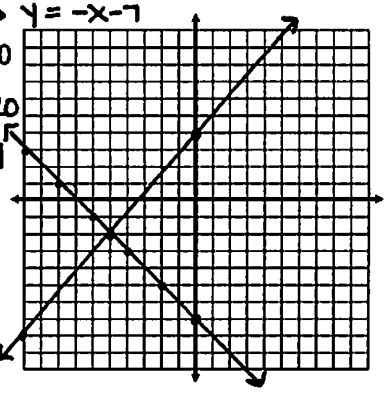
$-8-6y=34$

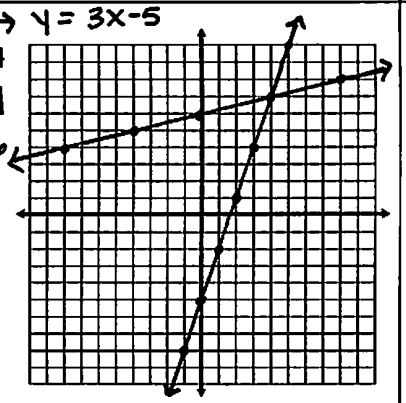
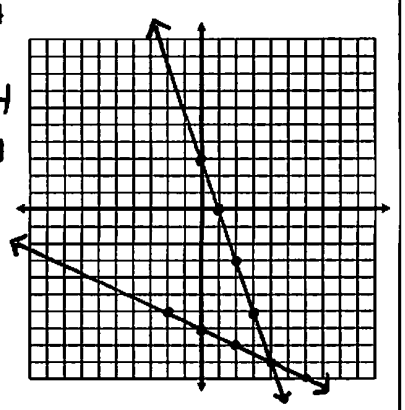
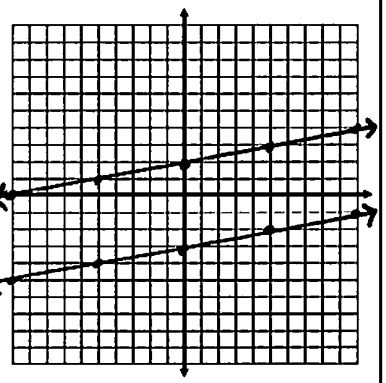
$-6y=42$

$y=-7$

$(-4,-7)$

SOLVING SYSTEM OF EQUATIONS: Methods Comparison

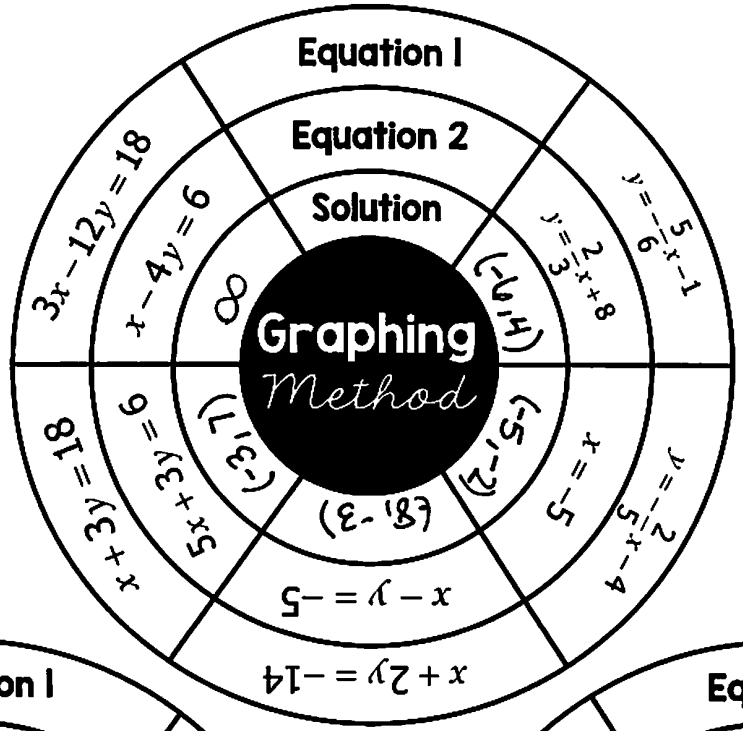
	GRAPHING	SUBSTITUTION	ELIMINATION
1	$\begin{cases} y = x+3 \\ y = -6x-4 \end{cases}$  $(-1,2)$	$x+3 = -6x-4$ $7x+3 = -4$ $7x = -7$ $x = -1$ $y = -1+3$ $y = 2$ $(-1,2)$	$y = x+3$ $-(y = -6x-4)$ $0 = 7x+7$ $-7 = 7x$ $-1 = x$ $y = -1+3$ $y = 2$ $(-1,2)$
2	$\begin{cases} y = x+7 \\ 5x+3y = -27 \end{cases}$ $3y = -5x-27$ $y = \frac{-5}{3}x-9$  $(-6,1)$	$5x+3(x+7) = -27$ $5x+3x+21 = -27$ $8x+21 = -27$ $8x = -48$ $x = -6$ $y = -6+7$ $y = 1$ $(-6,1)$	$-x+y = 7$ $5x+3y = -27$ $\rightarrow$ $-3x+3y = 21$ $-(5x+3y = -27)$ $-8x = 48$ $x = -6$ $y = -6+7$ $y = 1$ $(-6,1)$
3	$\begin{cases} x+y = -7 \\ 6x-5y = -20 \end{cases}$ $\rightarrow$ $y = -x-7$ $-5y = -6x-20$ $y = \frac{6}{5}x+4$  $(-5,-2)$	$6x-5(-x-7) = -20$ $6x+5x+35 = -20$ $11x+35 = -20$ $11x = -55$ $x = -5$ $-5+y = -7$ $y = -2$ $(-5,-2)$	$x+y = -7$ $6x-5y = -20$ $\rightarrow$ $6x+6y = -42$ $-(6x-5y = -20)$ $11y = -22$ $y = -2$ $x-2 = -7$ $x = -5$ $(-5,-2)$

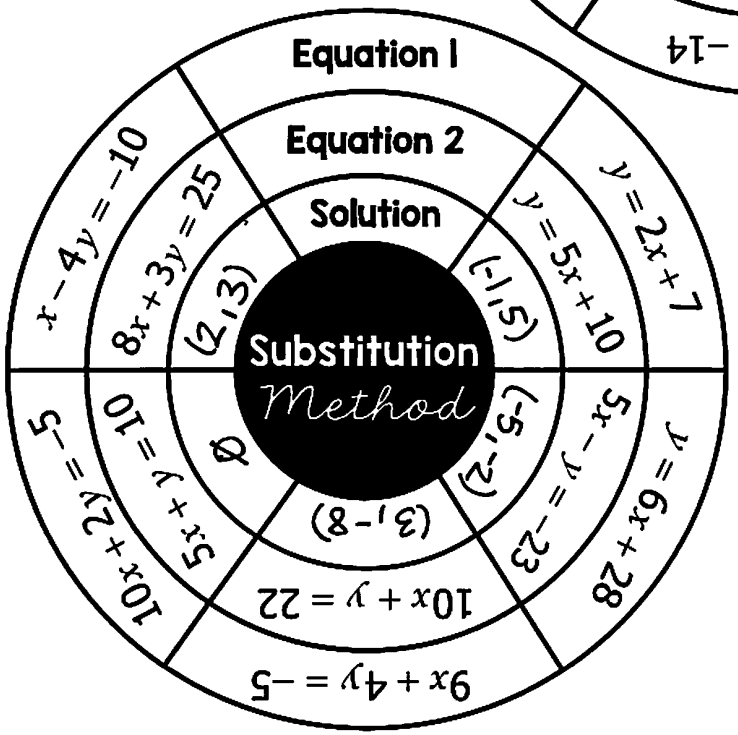
GRAPHING	SUBSTITUTION	ELIMINATION
4 $\begin{cases} 3x - y = 5 \\ x - 4y = -24 \end{cases}$ → $y = 3x - 5$ $-4y = -x - 24$ $y = \frac{1}{4}x + 6$  (4,7)	$x - 4(3x - 5) = -24$ $x - 12x + 20 = -24$ $-11x + 20 = -24$ $-11x = -44$ $x = 4$ $y = 3(4) - 5$ $y = 12 - 5$ $y = 7$ (4,7)	$3x - y = 5$ $x - 4y = -24$ → $12x - 4y = 20$ $-(x - 4y = -24)$ $11x = 44$ $x = 4$ $4 - 4y = -24$ $-4y = -28$ $y = 7$ (4,7)
5 $\begin{cases} x + 2y = -14 \\ 3x + y = 3 \end{cases}$ $2y = -x - 14$ $y = -\frac{1}{2}x - 7$ $y = -3x + 3$  (4,-9)	$3(-2y - 14) + y = 3$ $-6y - 42 + y = 3$ $-5y - 42 = 3$ $-5y = 45$ $y = -9$ $3x - 9 = 3$ $3x = 12$ $x = 4$ (4,-9)	$x + 2y = -14$ $3x + y = 3$ → $x + 2y = -14$ $-(6x + 2y = 6)$ $-5x = -20$ $x = 4$ $4 + 2y = -14$ $2y = -18$ $y = -9$ (4,-9)
6 $\begin{cases} x - 5y = 15 \\ 2x - 10y = -20 \end{cases}$ $-5y = -x + 15$ $y = \frac{1}{5}x - 3$ $-10y = -2x - 20$ $y = \frac{1}{5}x + 2$  ∅	$2(5y + 15) - 10y = -20$ $10y + 30 - 10y = -20$ $30 \neq -20$ ∅	$x - 5y = 15$ $2x - 10y = -20$ → $2x - 10y = 30$ $-(2x - 10y = -20)$ $0 \neq 50$ ∅

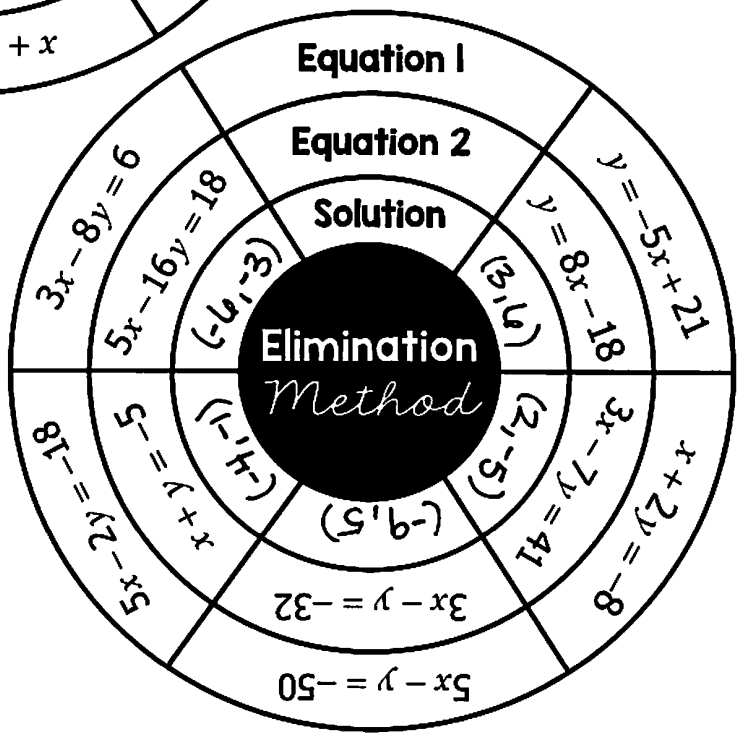
SYSTEMS OF EQUATIONS

BULLSEYES

Directions: Solve the system of equations using the method in the center of the bullseye. Use the graphs on the back of this paper and notebook paper to organize your work. Write your solutions on the bullseyes.







Where do Snowman Keep their Money?

Directions: Solve each system of equations by using the **indicated method.** Show all work on a separate sheet of paper. After each set, find matching answers between the columns. One will have a letter and the other a number. Write the letter in the matching numbered box at the bottom of the page.

SET 1: Solve by Graphing

A. $\begin{cases} y = -x + 2 \\ y = \frac{1}{4}x + 7 \end{cases}$ (-4,6)

N. $\begin{cases} x - 5y = 15 \\ 3x + 5y = 5 \end{cases}$ (5,-2)

O. $\begin{cases} x - y = -2 \\ 3x - y = -8 \end{cases}$ (-3,-1)

5. $\begin{cases} y = -\frac{4}{3}x - 5 \\ y = \frac{2}{3}x + 1 \end{cases}$ (-3,-1)

2. $\begin{cases} x - y = 7 \\ 6x + 5y = 20 \end{cases}$ (5,-2)

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

SET 2: Solve by Substitution

N. $\begin{cases} y = 2x - 11 \\ y = -3x + 24 \end{cases}$ (7,3)

S. $\begin{cases} 8x - 2y = 18 \\ y = 4x - 9 \end{cases}$ ∞

I. $\begin{cases} 4x + 7y = 6 \\ -5x + y = 12 \end{cases}$ (-2,2)

B. $\begin{cases} 7x - 2y = 25 \\ x + 3y = -26 \end{cases}$ (1,-9)

7. $\begin{cases} y = -4x - 5 \\ y = -x - 8 \end{cases}$ (1,-9)

1. $\begin{cases} y = -3x - 4 \\ 8x - 5y = -26 \end{cases}$ (-2,2)

11. $\begin{cases} x + y = 6 \\ 2x + 2y = 12 \end{cases}$ ∞

9. $\begin{cases} x - 4y = -5 \\ 5x + 3y = 44 \end{cases}$ (7,3)

SET 3: Solve by Elimination

N. $\begin{cases} x + 5y = -23 \\ x - y = 1 \end{cases}$ (-3,-4)

K. $\begin{cases} 7x + 3y = 50 \\ 4x + 3y = 26 \end{cases}$ (8,-2)

S. $\begin{cases} 2x - 4y = 10 \\ x - 2y = 8 \end{cases}$ Ø

W. $\begin{cases} 5x + 4y = -25 \\ 7x + 12y = -35 \end{cases}$ (-5,0)

10. $\begin{cases} 2x - 3y = 22 \\ 2x + 5y = 6 \end{cases}$ (8,-2)

3. $\begin{cases} 5x - y = 15 \\ 5x - y = 20 \end{cases}$ Ø

6. $\begin{cases} 3x + y = -15 \\ 5x + 6y = -25 \end{cases}$ (-5,0)

4. $\begin{cases} 4x + 3y = -24 \\ 2x - 9y = 30 \end{cases}$ (-3,-4)

ANSWER:

1.	2.		3.	4.	5.	6.		7.	8.	9.	10.	11.	
I	N		S	N	O	W		B	A	N	K	S	!

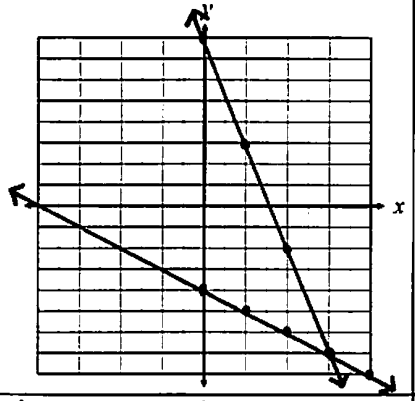
Name: _____ **Unit 6:** Systems of Equations

Date: _____ **Per:** _____ **Homework 6:** Solving Systems (All Methods)

**** This is a 2-page document! ****

Directions: Solve each system of equations by **graphing**.

1. $\begin{cases} y = -\frac{5}{2}x + 8 \\ y = -\frac{1}{2}x - 4 \end{cases}$

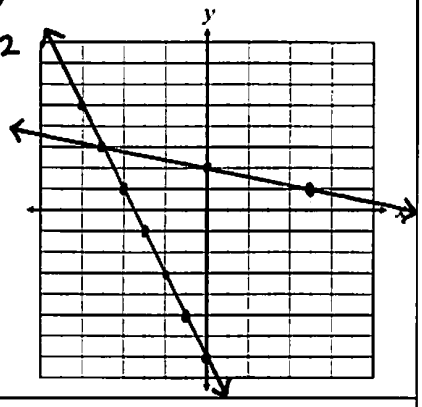


(6, -7)

2. $\begin{cases} y = -2x - 7 \\ x + 5y = 10 \end{cases}$

$5y = -x + 10$

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

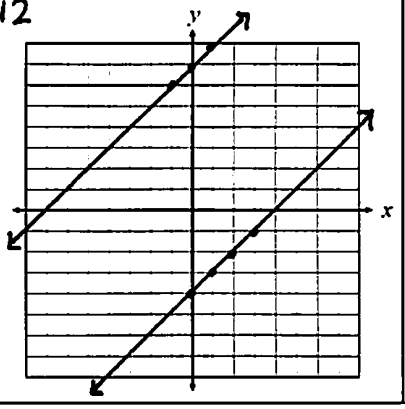


(-5, 3)

3. $\begin{cases} x - y = -7 \\ 3x - 3y = 12 \end{cases}$ → $y = x + 7$

$-3y = -3x + 12$

$y = x - 4$

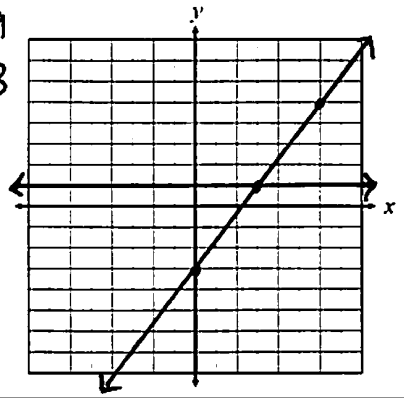


∅

4. $\begin{cases} 4x - 3y = 9 \\ y = 1 \end{cases}$

$-3y = -4x + 9$

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



(3, 1)

Directions: Solve each system of equations by **substitution**.

5. $\begin{cases} y = -6x + 8 \\ y = 5x - 14 \end{cases}$

$-6x + 8 = 5x - 14$

$8 = 11x - 14$

$22 = 11x$

$2 = x$

$y = 5(2) - 14$

$y = 10 - 14$

$y = -4$

(2, -4)

6. $\begin{cases} y = 3x + 19 \\ 8x + 2y = -18 \end{cases}$

$8x + 2(3x + 19) = -18$

$8x + 6x + 38 = -18$

$14x + 38 = -18$

$14x = -56$

$x = -4$

$y = 3(-4) + 19$

$y = -12 + 19$

$y = 7$

(-4, 7)

7. $\begin{cases} x+y=2 \\ 4x+5y=7 \end{cases}$ → $x=-y+2$

$4(-y+2)+5y=7$

$-4y+8+5y=7$

$y+8=7$

$y=-1$

$x-1=2$

$x=3$

$(3,-1)$

8. $\begin{cases} 5x-3y=62 \\ x-2y=25 \end{cases}$ → $x=2y+25$

$5(2y+25)-3y=62$

$10y+125-3y=62$

$7y+125=62$

$7y=-63$

$y=-9$

$x-2(-9)=25$

$x+18=25$

$x=7$

$(7,-9)$

Directions: Solve each system of equations by **elimination**.

9. $\begin{cases} y=-8x-4 \\ y=-2x+2 \end{cases}$

$0=-6x-6$

$6=-6x$

$-1=x$

$y=-2(-1)+2$

$y=2+2$

$y=4$

$(-1,4)$

10. $\begin{cases} x+7y=38 \\ x-2y=-16 \end{cases}$

$9y=54$

$y=6$

$x-2(6)=-16$

$x-12=-16$

$x=-4$

$(-4,6)$

11. $\begin{cases} -2x+8y=30 \\ 7x+8y=3 \end{cases}$

$-9x=27$

$x=-3$

$-2(-3)+8y=30$

$6+8y=30$

$8y=24$

$y=3$

$(-3,3)$

12. $\begin{cases} 2x+3y=1 \\ 6x+5y=23 \end{cases}$ → $6x+9y=3$

$-(6x+5y=23)$

$4y=-20$

$y=-5$

$2x+3(-5)=1$

$2x-15=1$

$2x=16$

$x=8$

$(8,-5)$

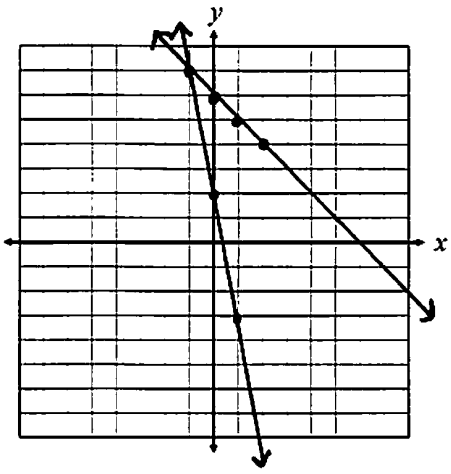
Name: _____ **Pre-Algebra**

Date: _____ **Per:** _____ **Unit 6:** Systems of Equations

Quiz 6-2: Solving Systems of Equations (All Methods)

For questions 1-2, solve the system of equations by graphing.

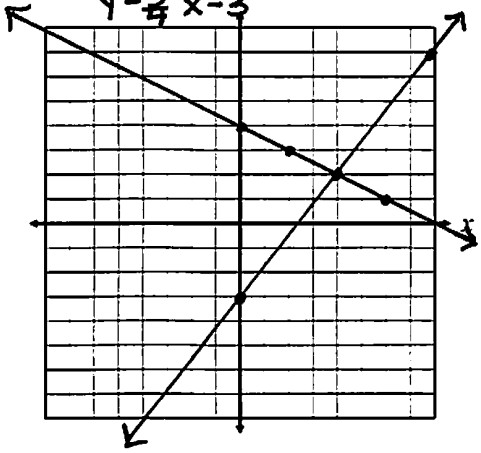
1. $\begin{cases} y = -x + 6 \\ y = -5x + 2 \end{cases}$



2. $\begin{cases} x + 2y = 8 \\ 5x - 4y = 12 \end{cases}$ → $2y = -x + 8$, $y = -\frac{1}{2}x + 4$

$-4y = -5x + 12$

$y = \frac{5}{4}x - 3$



1. (-1, 7)
2. (4, 2)
3. (3, -5)
4. (-5, 9)
5. ∅
6. (-7, -2)

For questions 3-6, solve the system of equations by substitution.

3. $\begin{cases} y = -6x + 13 \\ y = -2x + 1 \end{cases}$

$-6x + 13 = -2x + 1$

$13 = 4x + 1$

$12 = 4x$

$x = 3$

$y = -2(3) + 1$

$y = -6 + 1$

$y = -5$

4. $\begin{cases} y = -2x - 1 \\ 3x - 4y = -51 \end{cases}$

$3x - 4(-2x - 1) = -51$

$3x + 8x + 4 = -51$

$11x + 4 = -51$

$11x = -55$

$x = -5$

$y = -2(-5) - 1$

$y = 10 - 1$

$y = 9$

5. $\begin{cases} 4x + y = -5 \\ 20x + 5y = 10 \end{cases}$ → $y = -4x - 5$

$20x + 5(-4x - 5) = 10$

$20x - 20x - 25 = 10$

$-25 \neq 10$

6. $\begin{cases} 2x - 5y = -4 \\ x - 8y = 9 \end{cases}$ → $x = 8y + 9$

$2(8y + 9) - 5y = -4$

$16y + 18 - 5y = -4$

$11y + 18 = -4$

$11y = -22$

$y = -2$

$x - 8(-2) = 9$

$x + 16 = 9$

$x = -7$

For questions 7-10, solve the system of equations by elimination.

7. $\begin{cases} y = -3x - 11 \\ y = -6x - 23 \end{cases}$

$0 = 3x + 12$

$-12 = 3x$

$-4 = x$

$y = -3(-4) - 11$

$y = 12 - 11$

$y = 1$

8. $\begin{cases} x + y = -1 \\ x - 7y = 23 \end{cases}$

$8y = -24$

$y = -3$

$x - 3 = -1$

$x = 2$

9. $\begin{cases} 7x - 4y = -10 \\ 3x - 4y = -2 \end{cases}$

$4x = -8$

$x = -2$

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

$-6 - 4y = -2$

$-4y = 4$

$y = -1$

10. $\begin{cases} 7x + 12y = 46 \\ 5x + 6y = 20 \end{cases} \rightarrow$

$7x + 12y = 46$

$-(10x + 12y = 40)$

$-3x = 6$

$x = -2$

$5(-2) + 6y = 20$

$-10 + 6y = 20$

$6y = 30$

$y = 5$

7.	$(-4, 1)$
8.	$(2, -3)$
9.	$(-2, -1)$
10.	$(-2, 5)$
B.	$(-6, -8)$

BONUS: Solve the system of equations by substitution or elimination: $\begin{cases} \frac{1}{3}x + y = -10 \\ \frac{7}{2}x - \frac{5}{4}y = -11 \end{cases}$ $\rightarrow y = -\frac{1}{3}x - 10$

$\frac{7}{2}x - \frac{5}{4}\left(-\frac{1}{3}x - 10\right) = -11$

$\frac{7}{2}x + \frac{5}{12}x + \frac{25}{2} = -11$

$\frac{42}{12}x + \frac{5}{12}x + \frac{25}{2} = -11$

$\frac{47}{12}x + \frac{25}{2} = -11$

$\frac{12}{47} \cdot \frac{47}{12}x = -\frac{47}{2} \cdot \frac{12}{47}$

$x = -6$

$\frac{1}{3}(-6) + y = -10$

$-2 + y = -10$

$y = -8$

SYSTEMS OF EQUATIONS *Applications*

Many real world problems can be modeled and solved using a system of equations. Use the process below to solve these problems.

1. **DEFINE YOUR TWO VARIABLES** → 2. **WRITE A SYSTEM OF EQUATIONS** using the given information. → 3. **SOLVE THE SYSTEM!** → 4. **ANSWER IT!** Give exactly what the problem is asking for.

1. The sum of two numbers is 51. The difference of the numbers is 13. Find the numbers.

Variables:
let x = one number
let y = another number

System:
$x + y = 51$
$x - y = 13$

Solve:
$x + y = 51$
$x - y = 13 \rightarrow x = y + 13$

$y + 13 + y = 51$
$2y + 13 = 51$
$2y = 38$
$y = 19$

$x + 19 = 51$
$x = 32$

Solution: 32 and 19

2. Braden bought three adult tickets and one child ticket at the movie theater and paid $32. Karen bought seven adult tickets and two child tickets and paid $73. Find the cost for one child ticket.

Variables:
let x = adult tickets
let y = child tickets

System:
$3x + y = 32$
$7x + 2y = 73$

Solve:
$3x + y = 32 \rightarrow y = -3x + 32$
$7x + 2y = 73$

$7x + 2(-3x + 32) = 73$
$7x - 6x + 64 = 73$
$x + 64 = 73$
$x = 9$

$3(9) + y = 32$
$27 + y = 32$
$y = 5$

Solution: \$5 / child ticket

3. At the fast food restaurant, one hamburger and five small fries cost $8.74. If two hamburgers and three small fries cost $7.75, what is the cost of one hamburger?

Variables:
let x = hamburger
let y = small fry

System:
$x + 5y = 8.74$
$2x + 3y = 7.75$

Solve:
$x + 5y = 8.74 \rightarrow x = -5y + 8.74$
$2x + 3y = 7.75$

$2(-5y + 8.74) + 3y = 7.75$
$-10y + 17.48 + 3y = 7.75$
$-7y = -9.73$
$y = 1.39$

$2x + 3(1.39) = 7.75$
$2x + 4.17 = 7.75$
$2x = 3.58$
$x = 1.79$

Solution: \$1.79 / hamburger

4. Colton sold a total of 28 t-shirts and sweatshirts as part of a fundraiser for his football team. If t-shirts cost $12 each and sweatshirts cost $20 each and he raised a total of $424, how many t-shirts did he sell?

Variables:
let x = tshirts
let y = sweatshirts

System:
$x + y = 28$
$12x + 20y = 424$

Solve:
$x + y = 28 \rightarrow x = -y + 28$
$12x + 20y = 424$
$12(-y + 28) + 20y = 424$
$-12y + 336 + 20y = 424$
$8y + 336 = 424$
$8y = 88$
$y = 11$

$x + 11 = 28$
$x = 17$

Solution: 17 tshirts

5. Katelyn has two part-time jobs: tutoring and working at the grocery store. Last week, she worked a total of 15 hours. If she makes $15 per hour tutoring and $9 per hour at the grocery store and made a total of $159, how many hours did she work at the grocery store?

Variables:
let x = tutoring
let y = grocery store

System:
$x + y = 15$
$15x + 9y = 159$

Solve:
$x + y = 15 \rightarrow x = -y + 15$
$15x + 9y = 159$
$15(-y + 15) + 9y = 159$
$-15y + 225 + 9y = 159$
$-6y + 225 = 159$
$-6y = -66 \quad y = 11$

Solution: 11 hours

6. Rick bought a total of 8 pounds of steak and chicken. If steak costs $13.50 per pound and chicken costs $3.25 per pound and he paid a total of $77.25, how many pounds of steak did he purchase?

Variables:
let x = steak
let y = chicken

System:
$x + y = 8$
$13.5x + 3.25y = 77.25$

Solve:
$x + y = 8 \rightarrow x = -y + 8$
$13.5x + 3.25y = 77.25$
$13.5(-y + 8) + 3.25y = 77.25$
$-13.5y + 108 + 3.25y = 77.25$
$-10.25y + 108 = 77.25$
$-10.25y = -30.75$
$y = 3$

$x + 3 = 8$
$x = 5$

Solution: 5 lb steak

7. Anna has a collection of 45 nickels and quarters worth $8.05. How many nickels does she have?

Variables:
let x = nickels
let y = quarters

System:
$x + y = 45$
$0.05x + 0.25y = 8.05$

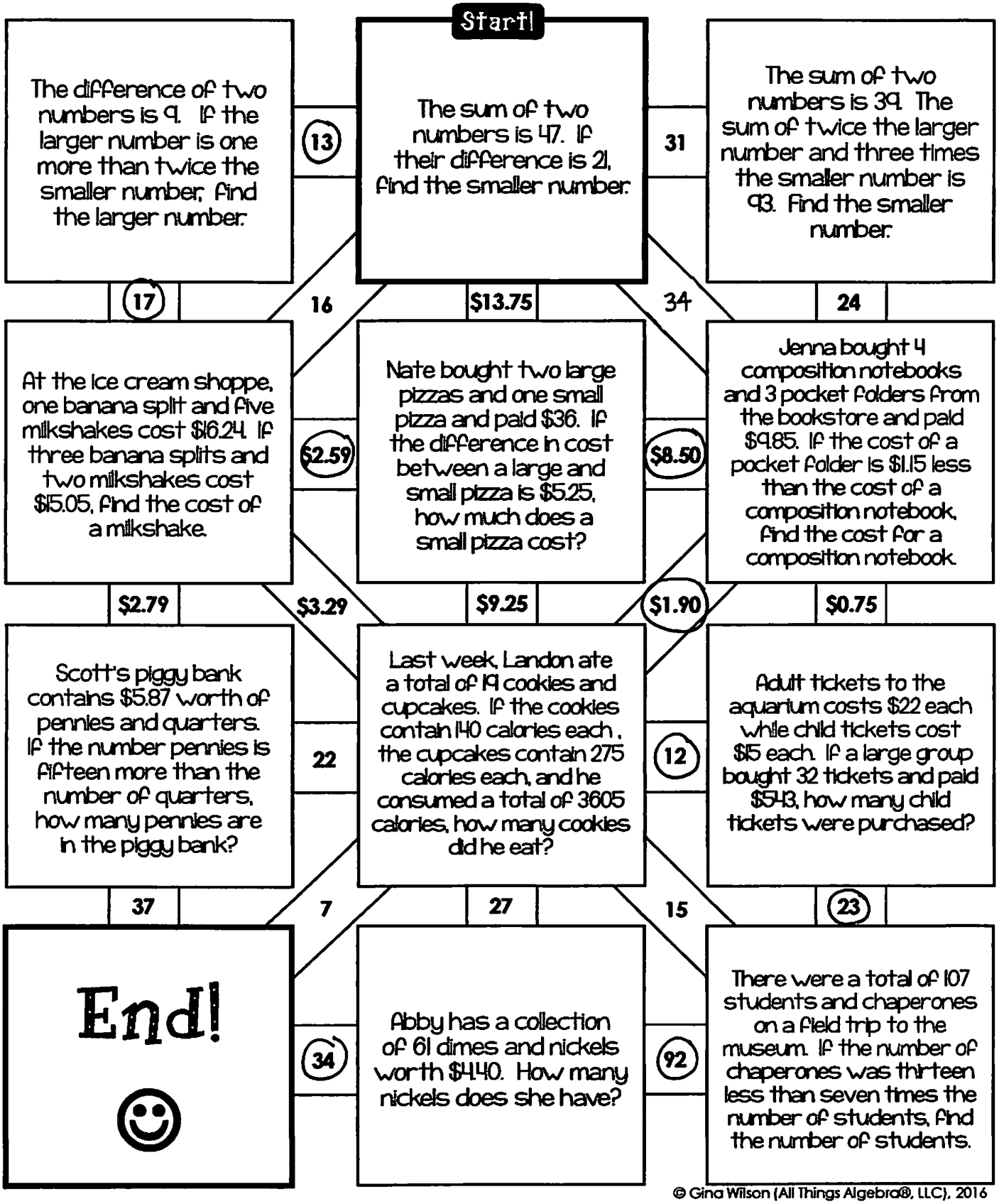
Solve:
$x + y = 45 \rightarrow x = -y + 45$
$0.05x + 0.25y = 8.05$
$0.05(-y + 45) + 0.25y = 8.05$
$-0.05y + 2.25 + 0.25y = 8.05$
$0.2y + 2.25 = 8.05$
$0.2y = 5.8$
$y = 29$

$x + 29 = 45$
$x = 16$

Solution: 16 nickels

Systems Word Problems Maze!

Directions: Set up a system of equations for each word problem then solve.. Use your solutions to navigate through the maze. **Staple all work to this paper!**



Name: _____ **Unit 6:** Systems of Equations

Date: _____ **Per:** _____ **Homework 7:** Systems Word Problems

**** This is a 2-page document! ****

1. The sum of two numbers is 53. If their difference is 25, find both numbers.

Variables:
let x = #1
let y = #2

System:
$x+y=53$
$x-y=25$

Solve:
$x+y=53$
$x-y=25 \rightarrow x=y+25$

$y+25+y=53$
$2y+25=53$
$2y=28$
$y=14$

$x+14=53$
$x=39$

Solution: 39 and 14

2. Rob and Adam went to Taco Express. Rob bought seven tacos and two fajitas and paid $12.65. Adam bought four tacos and one fajita and paid $6.95. Find the cost of a taco.

Variables:
let x = tacos
let y = fajitas

System:
$7x+2y=12.65$
$4x+y=6.95$

Solve:
$7x+2y=12.65$
$4x+y=6.95 \rightarrow y=-4x+6.95$

$7x+2(-4x+6.95)=12.65$
$7x-8x+13.90=12.65$
$-x+13.90=12.65$
$-x=-1.25$
$x=1.25$

Solution: $1.25 / taco

3. The soccer team is selling tubs of cookie dough and brownie mix for a fundraiser. Elaina raised $75 by selling one tub of cookie dough and five tubs of brownie mix. Megan raised $141 by selling three tubs of cookie dough and eight tubs of brownie mix. How much is a tub of brownie mix?

Variables:
let x = cookie mix
let y = brownie mix

System:
$x+5y=7$
$3x+8y=141$

Solve:
$x+5y=7 \rightarrow x=-5y+7$
$3x+8y=141$

$3(-5y+7)+8y=141$
$-15y+225+8y=141$
$-7y=-84$
$y=12$

Solution: $12 / brownie tub

4. A theater sold a total of 98 adult and senior tickets to the sneak preview of a movie. Adult tickets sold for $12 each and senior tickets sold for $8, bringing in a total of $1,072. How many adult tickets were sold?

Variables:
let x = adult
let y = Senior

System:
$x+y=98$
$12x+8y=1072$

Solve:
$x+y=98 \rightarrow x=-y+98$
$12x+8y=1072$

$12(-y+98)+8y=1072$
$-12y+1176+8y=1072$
$-4y+1176=1072$
$-4y=-104$
$y=26$

$x+26=98$
$x=72$

Solution: 72 tickets

5. Elijah bought a total of 16 pounds of peanuts and cashew nuts and paid $49.50. If peanuts cost $2.75 per pound and cashew nuts cost $3.25 per pound, how many pounds of cashew nuts did he buy?

Variables:
let x = peanuts
let y = cashews

System:
$x + y = 16$
$2.75x + 3.25y = 49.50$

Solve:
$x + y = 16 \rightarrow x = -y + 16$
$2.75x + 3.25y = 49.5$

$2.75(-y + 16) + 3.25y = 49.5$
$-2.75y + 44 + 3.25y = 49.5$
$.5y + 44 = 49.5$
$.5y = 5.5$
$y = 11$

Solution: 11 lb | cashews

6. Bella has a cell phone plan in which she pays for each call minute and text message she sends. The total number of minutes used and text messages sent last month was 561. If call minutes cost 8¢ each and text messages cost 5¢ each and her bill was $34.26, how many minutes did she use?

Variables:
let x = call
let y = text

System:
$x + y = 561$
$0.08x + 0.05y = 34.26$

Solve:
$x + y = 561 \rightarrow y = -x + 561$
$0.08x + 0.05y = 34.26$

$0.08x + 0.05(-x + 561) = 34.26$
$0.08x - 0.05x + 28.05 = 34.26$
$0.03x + 28.05 = 34.26$
$0.03x = 6.21$
$x = 207$

$207 + y = 561$
$y = 354$

Solution: 354 min.

7. Allison burns 15 calories per minute on the elliptical and 12 calories per minute on the treadmill. If she spent one hour at the gym on these two machines and burned a total of 774 calories, how long did she spend on the elliptical?

Variables:
let x = elliptical
let y = treadmill

System:
$x + y = 60$
$15x + 12y = 774$

Solve:
$x + y = 60 \rightarrow y = -x + 60$
$15x + 12y = 774$

$15x + 12(-x + 60) = 774$
$15x - 12x + 720 = 774$
$3x + 720 = 774$
$3x = 54$
$x = 18$

Solution: 18 min

8. Max has a collection of 99 dimes and pennies worth $4.41. How many pennies does he have?

Variables:
let x = dimes
let y = pennies

System:
$x + y = 99$
$0.1x + 0.01y = 4.41$

Solve:
$x + y = 99 \rightarrow x = -y + 99$
$0.1x + 0.01y = 4.41$

$0.1(-y + 99) + 0.01y = 4.41$
$-0.1y + 9.9 + 0.01y = 4.41$
$-0.9y + 9.9 = 4.41$
$-0.9y = -5.49$
$y = 61$

Solution: 61 pennies

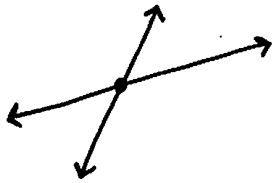
Unit 6 Test Study Guide
(Systems of Equations)

Name: _____

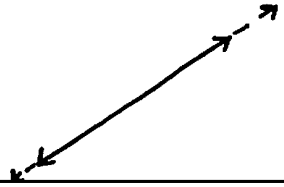
Date: _____ Per: _____

Topic 1: Writing Systems of Equations & Identifying Solutions

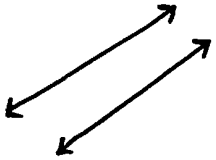
Sketch and label the three types of solutions possible for a system of equations.



One Solution (x,y)



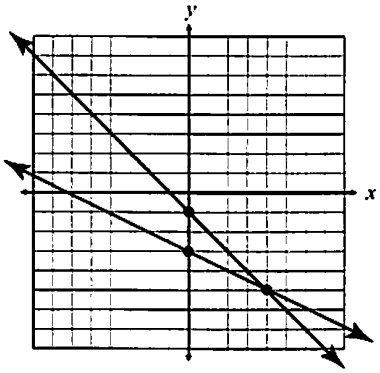
Infinite Solutions (∞)



No Solution (∅)

Write the system of equations shown on the graph and identify the solution.

1.

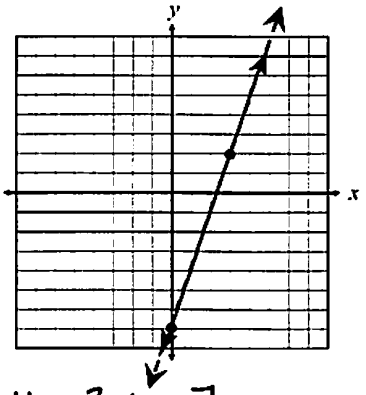


$y = -x - 1$

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

Solution: $(4, -5)$

2.



$y = 3x - 7$

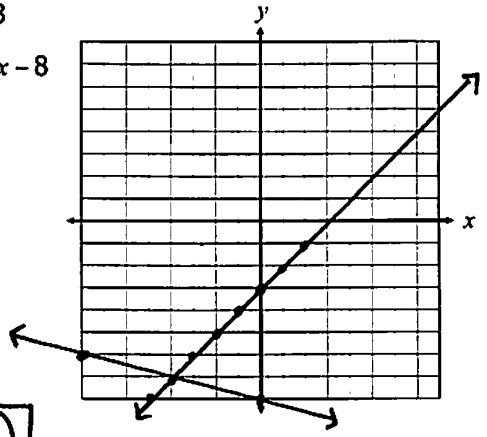
$y = 3x - 7$

Solution: ∞

Topic 2: Solving Systems of Equations by Graphing

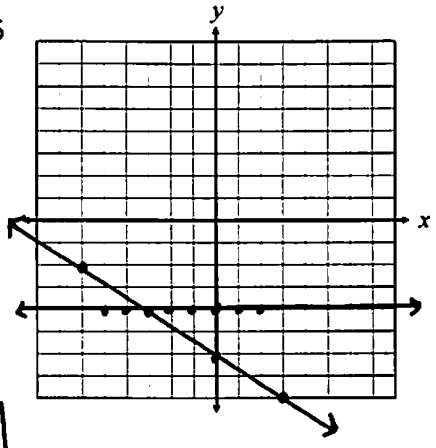
Solve each system by graphing. Be sure to clearly give the solution.

3. $\begin{cases} y = x - 3 \\ y = -\frac{1}{4}x - 8 \end{cases}$



$(-4, -7)$

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

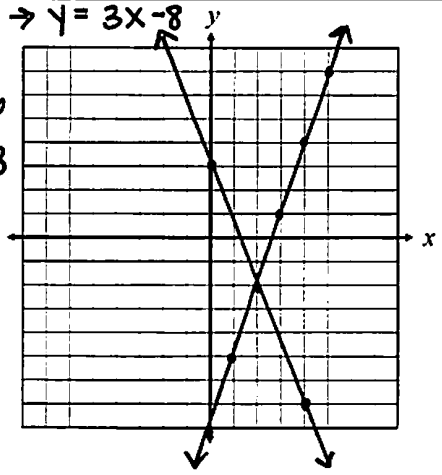


$(-4, -4)$

5. $\begin{cases} 3x - y = 8 \\ 5x + 2y = 6 \end{cases}$ → $y = 3x - 8$

$2y = -5x + 6$

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



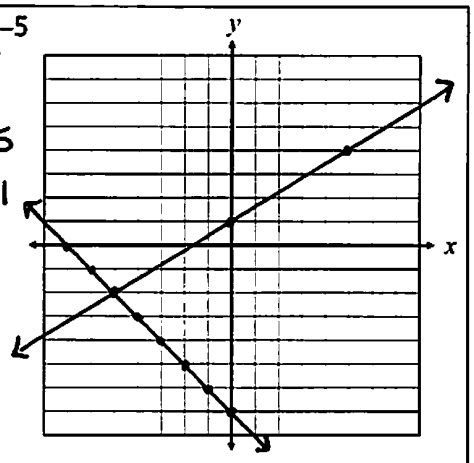
(2, −2)

6. $\begin{cases} 3x - 5y = -5 \\ x + y = -7 \end{cases}$

$-5y = -3x - 5$

$y = \frac{3}{5}x + 1$

$y = -x - 7$

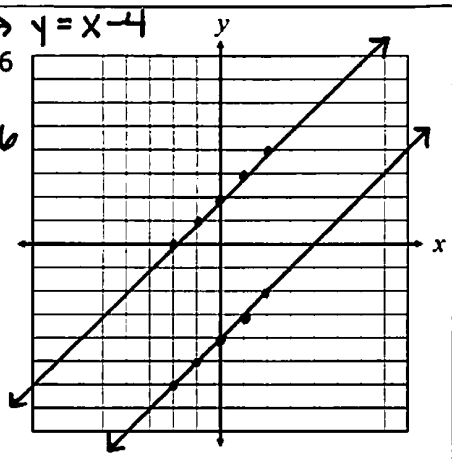


(−5, −2)

7. $\begin{cases} x - y = 4 \\ 3x - 3y = -6 \end{cases}$ → $y = x - 4$

$-3y = -3x - 6$

$y = x + 2$

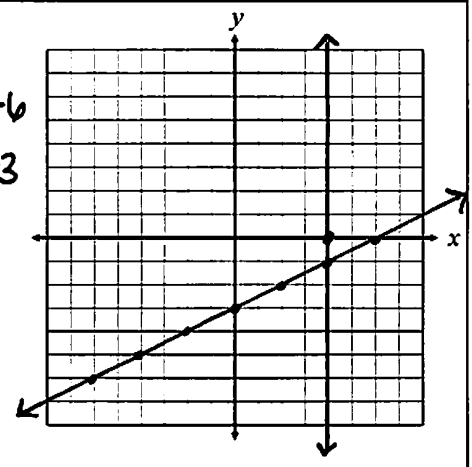


∅

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

$-2y = -x + 6$

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



(4, −1)

Topic 3: Solving Systems of Equations by Substitution

Solve each system by substitution. Be sure to clearly give the solution.

9. $\begin{cases} y = 2x - 13 \\ y = -4x + 29 \end{cases}$

$2x - 13 = -4x + 29$

$6x - 13 = 29$

$6x = 42$

$x = 7$

$y = 2(7) - 13$

$y = 14 - 13$

$y = 1$

(7, 1)

10. $\begin{cases} y = 6x + 14 \\ 2x - y = 2 \end{cases}$

$2x - (6x + 14) = 2$

$2x - 6x - 14 = 2$

$-4x - 14 = 2$

$-4x = 16$

$x = -4$

$y = 6(-4) + 14$

$y = -24 + 14$

$y = -10$

(−4, −10)

11. $\begin{cases} 9x-2y=15 \\ 7x+y=4 \end{cases}$ → $y=-7x+4$

$9x-2(-7x+4)=15$

$9x+14x-8=15$

$23x-8=15$

$23x=23$

$x=1$

$y=-7(1)+4$

$y=-7+4$

$y=-3$

$(1,-3)$

12. $\begin{cases} x-2y=-15 \\ 9x+7y=-10 \end{cases}$ → $x=2y-15$

$9(2y-15)+7y=-10$

$18y-135+7y=-10$

$25y-135=-10$

$25y=125$

$y=5$

$x=2(5)-15$

$x=10-15$

$x=-5$

$(-5,5)$

Topic 4: Solving Systems of Equations by Elimination

Solve each system by elimination. Be sure to clearly give the solution.

13. $\begin{cases} y=5x+17 \\ y=-6x-5 \end{cases}$

$-($ $)$

$0=11x+22$

$-22=11x$

$-2=x$

$y=5(-2)+17$

$y=-10+17$

$y=7$

$(-2,7)$

14. $\begin{cases} 2x-3y=0 \\ 2x+y=-16 \end{cases}$

$-($ $)$

$-4y=16$

$y=-4$

$2x-3(-4)=0$

$2x+12=0$

$2x=-12$

$x=-6$

$(-6,-4)$

15. $\begin{cases} x-3y=-12 \\ 5x-3y=-48 \end{cases}$

$-($ $)$

$-4x=36$

$x=-9$

$-9-3y=-12$

$-3y=-3$

$y=1$

$(-9,1)$

16. $\begin{cases} 4x+y=7 \\ 8x+2y=14 \end{cases}$ → $8x+2y=14$

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

$0=0$

∞

Topic 5: Solving Systems of Equations Applications

17. The sum of two numbers is 71. If their difference is 37, find both numbers.

Variables:
let $x = \#1$
let $y = \#2$

System:
$x + y = 71$
$x - y = 37$

Solve:
$x + y = 71 \rightarrow x = -y + 71$
$x - y = 37$

$-y + 71 - y = 37$
$-2y + 71 = 37$
$-2y = -34$
$y = 17$

$x + 17 = 71$
$x = 54$

Solution: 54 and 17

18. The florist charges \$31.75 for eight roses and five carnations. For one rose and three carnations, it costs \$5.75. What is the cost for a carnation?

Variables:
let x = rose
let y = carnation

System:

Solve:
$8x + 5y = 31.75$
$x + 3y = 5.75 \rightarrow x = -3y + 5.75$

$8(-3y + 5.75) + 5y = 31.75$
$-24y + 46 + 5y = 31.75$
$-19y + 46 = 31.75$
$-19y = -14.25$
$y = 0.75$

Solution: \$0.75/carn.

19. Mitch bought a total of 13 pizzas and buckets of wings for his big Super Bowl party. If it costs \$11.75 for a pizza and \$19.95 for a bucket of wings and he spent \$193.75, how many buckets of wings did he buy?

Variables:
let x = pizza
let y = wings

System:
$x + y = 13$
$11.75x + 19.95y = 193.75$

Solve:
$x + y = 13 \rightarrow x = -y + 13$
$11.75x + 19.95y = 193.75$

$11.75(-y + 13) + 19.95y = 193.75$
$-11.75y + 152.75 + 19.95y = 193.75$
$8.2y + 152.75 = 193.75$
$8.2y = 41$
$y = 5$

Solution: 5 buckets

20. A total of 800 pre-sale tickets and tickets at the gate were sold to the football city championship game. If the number of tickets sold at the gate was thirteen less than twice the number of pre-sale tickets, how many pre-sale tickets were sold?

Variables:
let x = presale
let y = gate

System:
$x + y = 800$
$y = 2x - 13$

Solve:
$x + y = 800$
$y = 2x - 13$

$x + 2x - 13 = 800$
$3x - 13 = 800$
$3x = 813$
$x = 271$

Solution: 271 tickets

Name: _____

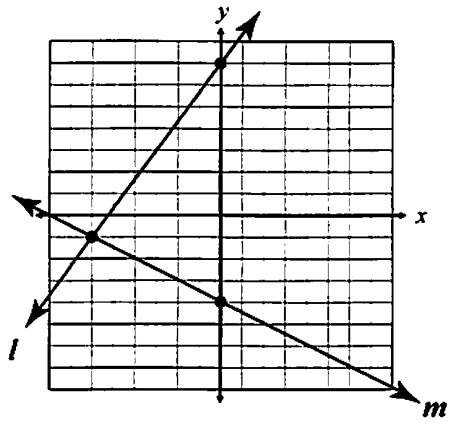
Date: _____ Per: _____

Unit 6 Test

Systems of Equations

Write the system of equations shown on each graph, then give the solution to the system.

1.

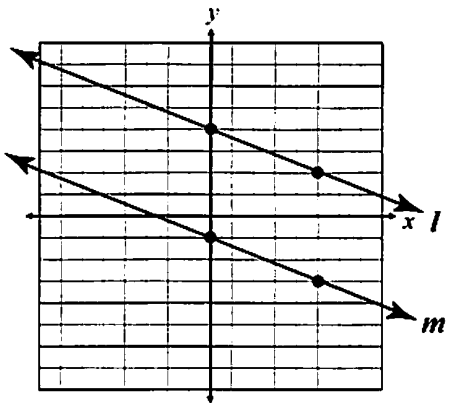


Line *l*: $y = \frac{4}{3}x + 7$

Line *m*: $y = -\frac{1}{2}x - 4$

Solution: $(-6, -1)$

2.



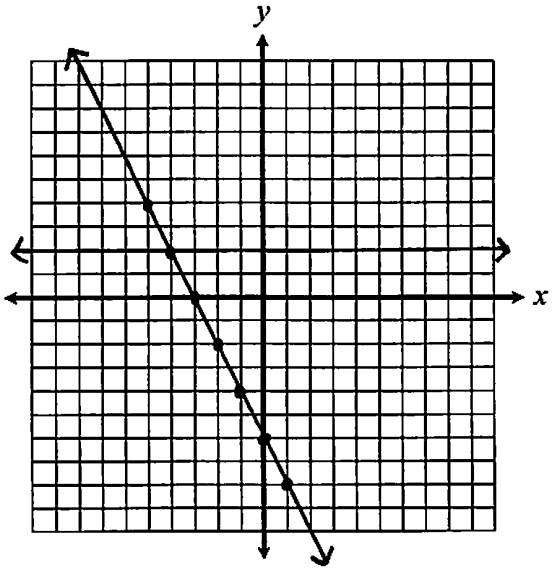
Line *l*: $y = -\frac{2}{5}x + 4$

Line *m*: $y = -\frac{2}{5}x - 1$

Solution: $\emptyset$

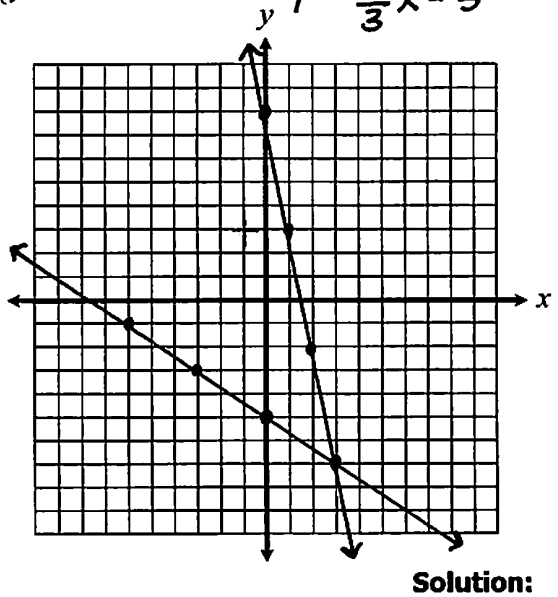
For questions 3-6, solve each system of equations by graphing.

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



Solution: $(-4, 2)$

4. $\begin{cases} 2x + 3y = -15 \\ y = -5x + 8 \end{cases}$ → $3y = -2x - 15$, $y = -\frac{2}{3}x - 5$

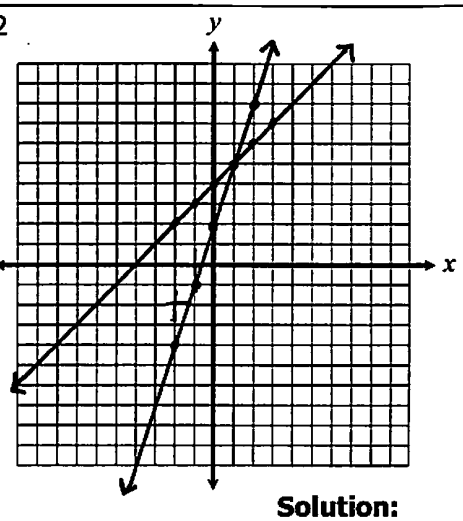


Solution: $(3, -7)$

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

$y = 3x + 2$

$y = x + 4$



Solution:

(1, 5)

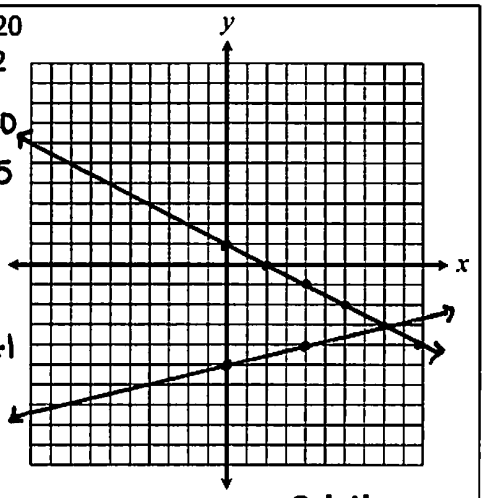
6. $\begin{cases} x - 4y = 20 \\ x + 2y = 2 \end{cases}$

$-4y = -x + 20$

$y = \frac{1}{4}x - 5$

$2y = -x + 2$

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



Solution:

(8, -3)

For questions 7-10, solve each system of equations by substitution.

7. $\begin{cases} y = -3x + 3 \\ y = 5x + 19 \end{cases}$

$-3x + 3 = 5x + 19$

$3 = 8x + 19$

$-16 = 8x$

$-2 = x$

$y = 5(-2) + 19$

$y = -10 + 19$

$y = 9$

Solution:

(-2, 9)

8. $\begin{cases} 5x - 2y = 33 \\ y = 7x - 39 \end{cases}$

$5x - 2(7x - 39) = 33$

$5x - 14x + 78 = 33$

$-9x + 78 = 33$

$-9x = -45$

$x = 5$

$y = 7(5) - 39$

$y = 35 - 39$

$y = -4$

Solution:

(5, -4)

9. $\begin{cases} 3x + y = 7 \\ 12x + 4y = 28 \end{cases}$ → $y = -3x + 7$

$12x + 4(-3x + 7) = 28$

$12x - 12x + 28 = 28$

$28 = 28$

Solution:

∞

10. $\begin{cases} x - 7y = 4 \\ 5x - 4y = -11 \end{cases}$ → $x = 7y + 4$

$5(7y + 4) - 4y = -11$

$35y + 20 - 4y = -11$

$31y + 20 = -11$

$31y = -31$

$y = -1$

$x = 7(-1) + 4$

$x = -7 + 4$

$x = -3$

Solution:

(-3, -1)

For questions 11-14, solve each system of equations by elimination.

11. $\begin{cases} y = 7x - 22 \\ y = -x - 6 \end{cases}$

$-(\quad)$

$0 = 8x - 16$

$16 = 8x$

$2 = x$

$y = -2 - 6$

$y = -8$

Solution: $(2, -8)$

12. $\begin{cases} x + y = -5 \\ 3x + 7y = -15 \end{cases}$ → $3x + 3y = -15$

$-(3x + 7y = -15)$

$-4y = 0$

$y = 0$

$x + 0 = -5$

$x = -5$

Solution: $(-5, 0)$

13. $\begin{cases} -8x + y = 1 \\ 5x + y = -12 \end{cases}$

$-(\quad)$

$-13x = 13$

$x = -1$

$-8(-1) + y = 1$

$8 + y = 1$

$y = -7$

Solution: $(-1, -7)$

14. $\begin{cases} 3x - 7y = -55 \\ x - 5y = -29 \end{cases}$ $3x - 7y = -55$

$-(3x - 15y = -87)$

$8y = 32$

$y = 4$

$x - 5(4) = -29$

$x - 20 = -29$

$x = -9$

Solution: $(-9, 4)$

For questions 15-18, define variables, set up a system of equations, then solve.

15. The sum of two numbers is 58. If their difference is 28, find both numbers.

Variables:

let $x = \#1$

let $y = \#2$

System:

$x + y = 58$

$x - y = 28$

Solve:

$x + y = 58$

$x - y = 28$ → $x = y + 28$

$y + 28 + y = 58$

$2y + 28 = 58$

$2y = 30$

$y = 15$

$x = 15 + 28$

$x = 43$

Solution: 43 and 15

16. At the hot dog stand, it costs $18.39 for five hot dogs and six bags of chips. If it costs $4.63 for one hot dog and two bags of chips, how much is a hot dog?

Variables:

let x = hotdog

let y = chips

System:

$5x + 6y = 18.39$

$x + 2y = 4.63$

Solve:

$5x + 6y = 18.39$

$x + 2y = 4.63 \rightarrow x = -2y + 4.63$

$5(-2y + 4.63) + 6y = 18.39$

$-10y + 23.15 + 6y = 18.39$

$-4y + 23.15 = 18.39$

$-4y = -4.76$

$y = 1.19$

$x + 2(1.19) = 4.63$

$x + 2.38 = 4.63$

$x = 2.25$

Solution: $2.25

17. It costs $525 for seven adult tickets and twelve youth tickets to the hockey game. If the difference in price between an adult ticket and a youth ticket is $18, find the cost of a youth ticket.

Variables:

let x = adult

let y = child

System:

$7x + 12y = 525$

$x - y = 18$

Solve:

$7x + 12y = 525$

$x - y = 18 \rightarrow x = y + 18$

$7(y + 18) + 12y = 525$

$7y + 126 + 12y = 525$

$19y + 126 = 525$

$19y = 399$

$y = 21$

Solution: $21

18. Levi purchased a total of 50 ride and game tickets and the amusement park and spent $29. If ride tickets cost 75¢ each and game tickets cost 50¢ each, how many ride tickets did he purchase?

Variables:

let x = ride

let y = game

System:

$x + y = 50$

$.75x + .50y = 29$

Solve:

$x + y = 50 \rightarrow y = -x + 50$

$.75x + .50y = 29$

$.75x + .50(-x + 50) = 29$

$.75x - .50x + 25 = 29$

$.25x + 25 = 29$

$.25x = 4$

$x = 16$

Solution: 16 ride tickets

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