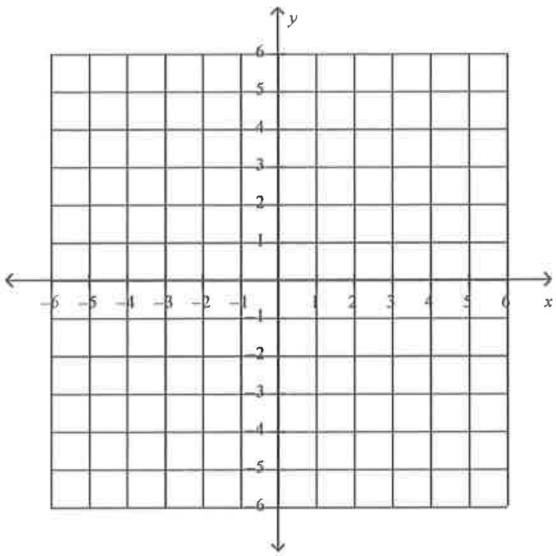
T6-1 Graphing Systems of Equations RETAKE WORKSHEET **Name:** ______________________

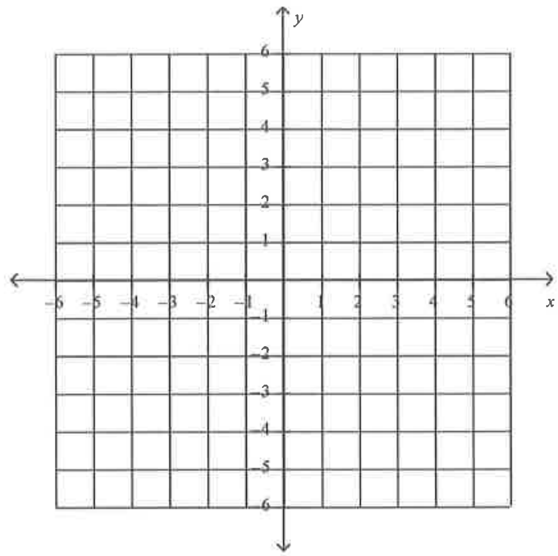
What is the **solution** to the following system of linear equations? If there is *no solution* or *infinitely many*, explain why.

Be sure to **verify** your answer **in BOTH original equations**!

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

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

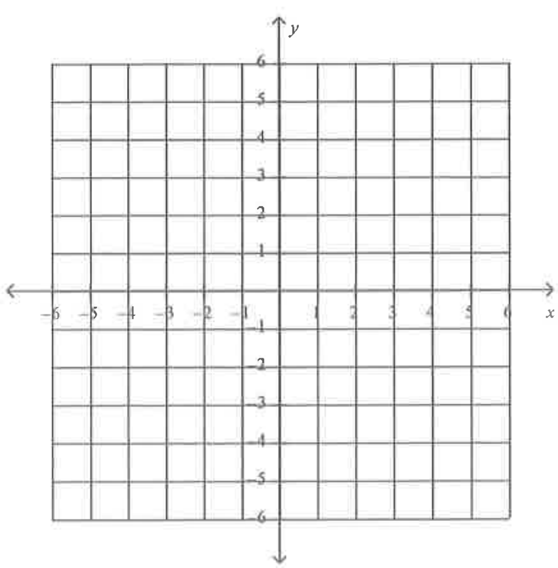


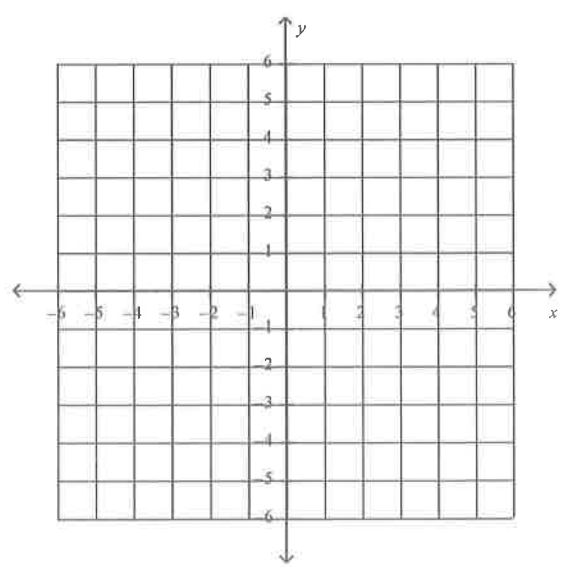


Don't forget to get y alone first!

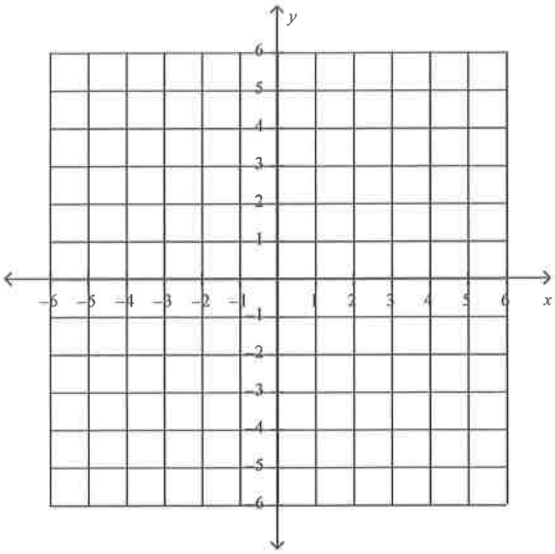
3) $\begin{cases} -6 + 2y = 4x \\ 4y + 8 = 2x + 8 \end{cases}$

4) $\begin{cases} -9x - 6y = -12 \\ -x + 2y = -4 \end{cases}$

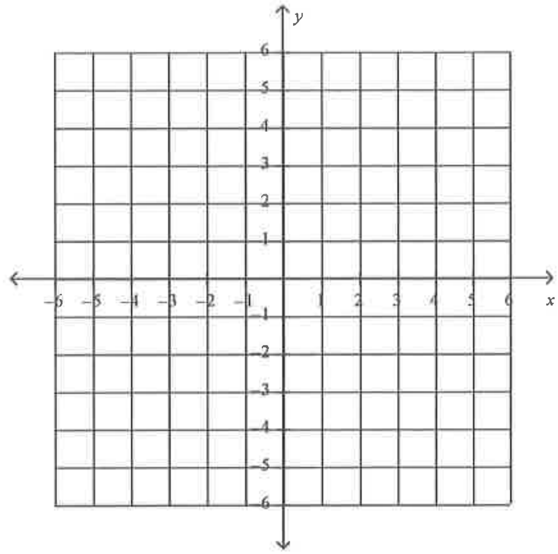




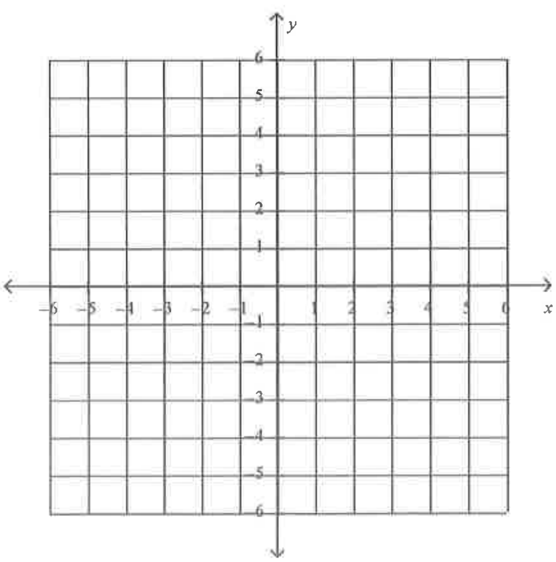
5) $\begin{cases} x = 5 \\ y = 2 \end{cases}$



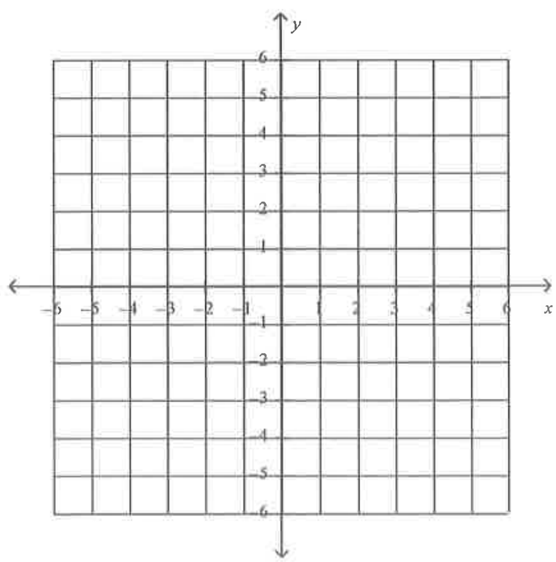
6) $\begin{cases} 2x - 5 = y \\ x = y + 1 \end{cases}$



7) $\begin{cases} 0 = -\frac{1}{2}y + x + 2 \\ y = 2x + 4 \end{cases}$



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



SUBSTITUTION METHOD RETAKE WS

T6-2

1) $2x + 8y = 20$
$y = 2$

2) $x = 5$
$2x + y = 10$

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

4) $2y + x = -15$
$x = 3y$

5) $4x + 7y = 19$
$y = x + 9$

6) $y = 6x + 11$
$2y - 4x = 14$

7) $2x - 8y = 6$
$y = -7 - x$

8) $x = 2y - 1$
$3x - 2y = -3$

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

10) $2x - 3y = -4$
$x + 3y = 7$

HARDCORE PROBLEM

11) $5x - 10y = 15$
$3x + 7y = 31$

Name__________________
Date ____________

Solving Linear Systems of Equations: Addition
(Elimination Method)

Elimination Method Using Multiplication:

Some systems of equations cannot be solved simply by adding or subtracting the equations. One or both equations must first be multiplied by a number before the system can be solved by elimination. Consider the following example:

Example 3: Use elimination to solve the system of equations $x + 10y = 3$ and $4x + 5y = 5$.

$x + 10y = 3$
$4x + 5y = 5$

Multiply $x + 10y = 3$ by -4. ⟹ $-4x - 40y = -12$
Then add the two equations. ⟹ $4x + 5y = 5$

$-35y = -7$

$\frac{-35y}{-35} = \frac{-7}{-35}$ $y = {}^1/_5$

Substitute ${}^1/_5$ for y into either original equation. Then solve for y. ⟹

$x + 10y = 3$
$x + 10({}^1/_5) = 3$
$x + 2 = 3$
$x + 2 - 2 = 3 - 2$ $x = 1$

The solution of this system is $(1, {}^1/_5)$

Use elimination to solve each system of equations:

6. $3x + 2y = 0$
$x - 5y = 17$

7. $2x + 3y = 6$
$x + 2y = 5$

8. $3x - y = 2$
$x + 2y = 3$

9. $4x + 5y = 6$
$6x - 7y = -20$

10. $4x + 2y = 8$
$16x - y = 14$

T6-3 Retake WS

Name_______________
Date ___________

Solving Linear Systems of Equations: Addition (Elimination Method)

Objective: *Use the elimination method (addition & multiplication) in order to solve the system of equations.*

Elimination Method Using Addition and Subtraction:

In systems of equations where the coefficient (the number in front of the variable) of the x or y terms are additive inverses, solve the system by adding the equations. Because one of the variables is eliminated, this method is called **elimination.**

Example 2: Use elimination to solve the system of equations $x - 3y = 7$ and $3x + 3y = 9$.

Add the two equations. ⟹

$$\begin{array}{r} x - 3y = 7 \\ + \; 3x + 3y = 9 \\ \hline 4x \quad\quad = 16 \end{array}$$

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

Substitute 4 for x in either original equation. Then solve for y. ⟹

$$x - 3y = 7$$
$$4 - 3y = 7$$
$$-3y = 3$$
$$\frac{-3y}{3} = \frac{3}{3} \qquad y = -1$$

The solution of this system is (4, -1).

Use elimination to solve each system of equations:

1. $2x + 2y = -2$
$3x - 2y = 12$

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

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

4. $6x + 5y = 4$
$6x - 7y = -20$

5. $2x - 3y = 12$
$4x + 3y = 24$

T6-4 RETAKE WS **Name**______________________________

Translating Words into Equations

Translating Word Problems into a System of Equations — When a word problem involves more than one unknown quantity or there are two (or more) equations or conditions to be satisfied, a system of equations may be used to solve the problem.

To translate the words into a system of equations, ask what two quantities are unknown and assign variables to them. The questions posed in the problem may give you a clue. Then write equations using those variables and the conditions given in the problem.

Example: Translate the following problem into a system of equations. (Do not solve.)
At a local high school city championship basketball game, 1435 tickets were sold. A student admission ticket cost $1.50 and an adult admission ticket cost $5.00. The total ticket receipts for the basketball game were $3552.50. How many of each type of ticket were sold?

Solution: The question in the problem asks "how many of each type of ticket were sold?" Therefore, the two unknown quantities are the number of student tickets (x) and the number of adult tickets (y). The problem gives one condition related to the total number of tickets sold and another related to the total receipts from the ticket sales. Write one equation (using the variables x and y) for each condition to obtain the following system:

$$\begin{cases} x + y = 1435 \\ 1.50x + 5.00y = 3552.50 \end{cases}$$

Guided Problems: (Define variables. Write equations. Solve.)

1. A grocer mixes peanuts that cost $2.49 per pound and walnuts that cost $3.89 per pound to make <u>100 pounds</u> of a mixture that costs <u>$3.19 per pound</u>. How much of each kind of nut is put into the mixture?

   $x =$ lbs of peanuts $\qquad x + y = 100$

   $y =$ lbs of walnuts $\qquad 2.49x + 3.89y = 3.19(100)$

   Substitution is the best method here.

   $$x = 100 - y$$
   $$2.49(100 - y) + 3.89y = 319$$
   $$\textit{There are } 50 \textit{ pounds of each kind in the mixture.}$$

Problem Set: Translate the following problems into a system of equations and solve. <u>Be sure to clearly label your variables and state answers in a complete sentence.</u>

2. Two pan pizzas and two beef burritos provide 3100 calories. One pan pizza and one beef burrito provide 1550 calories. How many calories are in each item?

3. A hotel has 150 rooms. Those with kitchen facilities rent for $100 per night and those without kitchen facilities rent for $80 per night. On a night when the hotel was completely occupied, revenues were $13,000. How many of each type of room does the hotel have?

4. Rent-A-Car rents compact cars for a fixed amount per day plus a fixed amount for each mile driven. Benito rented a car for 6 days, drove it 550 miles, and spent $337. Lisa rented the same car for 3 days, drove it 350 miles, and spend $185. What is the charge per day and the charge per mile for the compact car?

5. When I multiply my first lucky number by 3 and my second lucky number by 2, the addition of the resulting numbers produces a sum of 93. When I add twice my first lucky number to my second lucky number, the sum is 53. What are my lucky numbers?

6. A travel agency offers different getaways to New York. Plan A includes hotel accommodations for 3-nights and 2-pair of baseball tickets for $645. Plan B includes hotel accommodations for 5-nights and 4-pairs of baseball tickets for $1135. How much does a single hotel cost and how much does a single pair of baseball tickets cost?