



Warm Up



same sign
you must
subtract

1) Solve the following systems:

a) $2x - 3y = 16$

① $x + 2y = 1 - 2y \Rightarrow x = 1 - 2y$

Rearrange
for x

↓ sub into ②

$$2x - 3y = 16$$

$$2(1 - 2y) - 3y = 16$$

$$2 - 4y - 3y = 16$$

$$2 - 7y = 16$$

↑
alone

$$2 - 7y = 16 - 2$$

$$\frac{-7y}{-7} = \frac{14}{-7}$$

$$y = -2$$

← sub into ①

$$\begin{aligned} x &= 1 - 2y \\ &= 1 - 2(-2) \\ &= 1 + 4 \end{aligned}$$

$$x = 5 \quad (5, -2)$$

b) $5x + 4y = -7$

② $-(3x + 4y = -1)$

① $5x + 4y = -7$

② $-3x - 4y = +1$

$$\frac{2x}{2} = \frac{-6}{2}$$

$$x = -3$$

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

$$5(-3) + 4y = -7$$

$$-15 + 4y = -7 + 15$$

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

$$(-3, 2) \quad y = 2$$

Math 10 (Numbers Relations & Functions)


Name _____


Elimination


HW Solutions


Date _____


Solve each system by elimination.


 1) $2x + 8y = 8$
 $-3x - 8y = -4$

 2) $-x + 4y = 7$
 $x + 4y = 25$

 3) $-9x + 8y = 15$
 $-9x + 6y = 27$

 4) $-x - 5y = -3$
 $-x + 3y = 13$

 5) $-5x + 2y = 9$
 $6x - 2y = -8$

 6) $5x + 5y = 30$
 $5x + 2y = 12$

7) $-10x + 8y = -28$
 $9x + 4y = 14$

8) $-6x + y = -15$
 $-12x - 3y = -15$

9) $-5x + 10y = -10$
 $-7x - 5y = -14$

10) $-5x + 10y = 5$
 $10x - 4y = 6$

11) $7x - 2y = 24$
 $3x + 9y = 30$

12) $-3x - 2y = 2$
 $-5x - 3y = 6$

13) $3x - 6y = 30$
 $-10x - 9y = -13$

14) $7x - 10y = 0$
 $-9x - 4y = 0$

15) $-10x + 7y = 12$
 $-3x + 6y = -12$

16) $-3x + 4y = 2$
 $-5x + 3y = 29$

17) $-10x - 6y = -14$
 $8x + 5y = 11$

18) $-3x - 2y = 8$
 $-8x - 7y = 18$

$$\begin{aligned} 1) \quad & 2x + 8y = 8 \\ & -3x - 8y = -4 \\ & \quad \quad (-4, 2) \end{aligned}$$

$$\begin{aligned} 2) \quad & -x + 4y = 7 \\ & x + 4y = 25 \\ & \quad \quad (9, 4) \end{aligned}$$

$$\begin{array}{l} 3) \quad -9x + 8y = 15 \\ \quad -9x + 6y = 27 \\ \quad \quad (-7, -6) \end{array}$$

$$\begin{array}{l} 4) \quad -x - 5y = -3 \\ \quad -x + 3y = 13 \\ \quad \quad (-7, 2) \end{array}$$

$$\begin{array}{l} 5) \quad -5x + 2y = 9 \\ \quad \quad 6x - 2y = -8 \\ \quad \quad (1, 7) \end{array}$$

$$\begin{array}{l} 6) \quad 5x + 5y = 30 \\ \quad \quad 5x + 2y = 12 \\ \quad \quad (0, 6) \end{array}$$

Elimination using Multiplication

Consider the system

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

(Handwritten notes: The coefficient '1' in the first equation is circled in green. Red arrows point from the 'x' in the first equation to the 'x' in the second equation, and from the 'x' in the second equation to '-3' written next to it.)

$$\begin{aligned} (1) \quad -3x - 6y &= -18 \\ (2) \quad 3x + 3y &= -6 \\ \hline & -3y = -24 \end{aligned}$$

(Handwritten notes: The equations are numbered in red and blue circles. A green line is drawn through the x terms. The result -3y = -24 is written in green and underlined.)

How are they related?

$$y = 8$$

What could we do to equation 1 to make the "x" equal?

(Handwritten note: "Sub eq (1)" with a red arrow pointing down.)

answer



$$\begin{aligned} x + 2y &= 6 \\ x + 2(8) &= 6 \\ x + 16 &= 6 - 16 \end{aligned}$$

$$(-10, 8) \quad \boxed{x = -10}$$

Elimination using Multiplication

Consider the system

$$\begin{array}{l} x + 2y = 6 \\ 3x + 3y = -6 \end{array}$$

How are they related?

What could we do to equation 1 to make the "x" equal?

multiply equation 1 by 3



Elimination using Multiplication

Consider the system

$$\begin{array}{r} 3x + 6y = 18 \\ 3x + 3y = -6 \end{array}$$

Now subtract the equations



Elimination using Multiplication

Consider the system

$$3x + 6y = 18$$

$$\underline{-3x - 3y = +6}$$

Now subtract the equations

Answer



Elimination using Multiplication

Consider the system

$$3x + 6y = 18$$

$$-3x - 3y = +6$$

$$3y = 24$$

$$y = 8$$

Now subtract the equations

Sub into equation 1 (original) or the above

$$x + 2y = 6$$

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

$$x + 16 = 6$$

$$x = 6 - 16$$

$$x = -10$$

$$(-10, 6)$$

You Try

1)

$$x + 2y = 5$$

$$2x + 6y = 12$$

ANS:

$$\begin{array}{l} 2) \\ x + 2y = 4 \\ -(x - 4y = 16) \end{array}$$

ANS:

$$\begin{array}{l} x + 2y = 4 \\ -x + 4y = -16 \end{array}$$

Math 10 (Numbers Relations & Functions)

Name _____

Elimination **Same sheet as Yesterday**

Date _____

Solve each system by elimination.

$$\begin{aligned} 1) \quad & 2x + 8y = 8 \\ & -3x - 8y = -4 \end{aligned}$$

$$\begin{aligned} 2) \quad & -x + 4y = 7 \\ & x + 4y = 25 \end{aligned}$$

$$\begin{aligned} 3) \quad & -9x + 8y = 15 \\ & -9x + 6y = 27 \end{aligned}$$

$$\begin{aligned} 4) \quad & -x - 5y = -3 \\ & -x + 3y = 13 \end{aligned}$$

$$\begin{aligned} 5) \quad & -5x + 2y = 9 \\ & 6x - 2y = -8 \end{aligned}$$

$$\begin{aligned} 6) \quad & 5x + 5y = 30 \\ & 5x + 2y = 12 \end{aligned}$$

$$\begin{aligned} \text{😊 } 7) \quad & -10x + 8y = -28 \\ & 9x + 4y = 14 \quad \times(-2) \end{aligned}$$

$$\begin{aligned} \text{😊 } 8) \quad & -6x + y = -15 \\ & -12x - 3y = -15 \quad \times(-2) \end{aligned}$$

$$\begin{aligned} \text{😊 } 9) \quad & -5x + 10y = -10 \\ & -7x - 5y = -14 \quad \times(2) \end{aligned}$$

$$\begin{aligned} \text{😊 } 10) \quad & -5x + 10y = 5 \\ & 10x - 4y = 6 \end{aligned}$$

$$\begin{aligned} \text{😊 } 11) \quad & 7x - 2y = 24 \\ & 3x + 9y = 30 \end{aligned}$$

$$\begin{aligned} \text{😊 } 12) \quad & -3x - 2y = 2 \\ & -5x - 3y = 6 \end{aligned}$$

$$\begin{aligned} \text{😊 } 13) \quad & 3x - 6y = 30 \\ & -10x - 9y = -13 \end{aligned}$$

$$\begin{aligned} \text{😊 } 14) \quad & 7x - 10y = 0 \\ & -9x - 4y = 0 \end{aligned}$$

$$\begin{aligned} 15) \quad & -10x + 7y = 12 \\ & -3x + 6y = -12 \end{aligned}$$

$$\begin{aligned} 16) \quad & -3x + 4y = 2 \\ & -5x + 3y = 29 \end{aligned}$$

$$\begin{aligned} 17) \quad & -10x - 6y = -14 \\ & 8x + 5y = 11 \end{aligned}$$

$$\begin{aligned} 18) \quad & -3x - 2y = 8 \\ & -8x - 7y = 18 \end{aligned}$$

$$\begin{aligned} 7) \quad & -10x + 8y = -28 \\ & 9x + 4y = 14 \\ & (2, -1) \end{aligned}$$

$$\begin{aligned} 8) \quad & -6x + y = -15 \\ & -12x - 3y = -15 \\ & (2, -3) \end{aligned}$$

$$\begin{aligned} 9) \quad & -5x + 10y = -10 \\ & -7x - 5y = -14 \\ & (2, 0) \end{aligned}$$

$$\begin{aligned} 10) \quad & -5x + 10y = 5 \\ & 10x - 4y = 6 \\ & (1, 1) \end{aligned}$$

$$\begin{aligned} 11) \quad & 7x - 2y = 24 \\ & 3x + 9y = 30 \\ & (4, 2) \end{aligned}$$

$$\begin{aligned} 12) \quad & -3x - 2y = 2 \\ & -5x - 3y = 6 \\ & (-6, 8) \end{aligned}$$

$$\begin{aligned} 13) \quad & 3x - 6y = 30 \\ & -10x - 9y = -13 \\ & (4, -3) \end{aligned}$$

$$\begin{aligned} 14) \quad & 7x - 10y = 0 \\ & -9x - 4y = 0 \\ & (0, 0) \end{aligned}$$

$$\begin{array}{l} 15) \quad -10x + 7y = 12 \\ \quad \quad -3x + 6y = -12 \\ \quad \quad \quad (-4, -4) \end{array}$$

$$\begin{array}{l} 16) \quad -3x + 4y = 2 \\ \quad \quad -5x + 3y = 29 \\ \quad \quad \quad (-10, -7) \end{array}$$

$$\begin{aligned} 17) \quad & -10x - 6y = -14 \\ & 8x + 5y = 11 \\ & (2, -1) \end{aligned}$$

$$\begin{aligned} 18) \quad & -3x - 2y = 8 \\ & -8x - 7y = 18 \\ & (-4, 2) \end{aligned}$$

Homework:

Math 10B

Name _____

System of Equations: Elimination (Add & Sub)

Date _____

Solve each system by elimination.

1) $8x - 8y = 0$
 $-5x + 8y = -3$

2) $6x - 4y = 6$
 $-8x + 4y = 0$

3) $-3x + 8y = -15$
 $9x - 8y = -3$

4) $x + 3y = 18$
 $3x - 3y = -6$

5) $-x + 5y = -28$
 $x + 3y = -28$

6) $-5x + 3y = 10$
 $5x - 5y = 10$

7) $-4x + 5y = 25$
 $-4x + 6y = 22$

8) $-3x + 5y = 12$
 $-5x + 5y = 0$

11) $5x - y = 19$
 $-9x - y = -9$

12) $-2x + y = 0$
 $-6x + y = 20$

13) $10x = 18 + 8y$
 $-8y = -5x - 27$

14) $8y + 13 = 3x$
 $-8y = 9x + 25$

15) $4 + x = -2y$
 $16 + 8y - x = 0$

16) $-12 + 8x = 6y$
 $-5y - 10 = 4x$

Homework:

Math 10B

Name _____

System of Equations: Elimination (Add & Sub)

Date _____

Solve each system by elimination.

$$\begin{aligned} 1) \quad & 8x - 8y = 0 \\ & -5x + 8y = -3 \end{aligned}$$

$$\begin{aligned} 2) \quad & 6x - 4y = 6 \\ & -8x + 4y = 0 \end{aligned}$$

$$(-3, -6) \text{ add}$$

$$\begin{aligned} 3) \quad & -3x + 8y = -15 \\ & 9x - 8y = -3 \end{aligned}$$

$$\begin{aligned} 4) \quad & x + 3y = 18 \\ & 3x - 3y = -6 \end{aligned}$$

$$(3, 5) \text{ add}$$

$$\begin{aligned} 5) \quad & -x + 5y = -28 \\ & x + 3y = -28 \end{aligned}$$

$$\begin{aligned} 6) \quad & -5x + 3y = 10 \\ & 5x - 5y = 10 \end{aligned}$$

$$(-8, -10) \text{ add}$$

$$\begin{aligned} 7) \quad & -4x + 5y = 25 \\ & -4x + 6y = 22 \end{aligned}$$

$$\begin{aligned} 8) \quad & -3x + 5y = 12 \\ & -5x + 5y = 0 \end{aligned}$$

$$(6, 6) \text{ sub}$$

$$\begin{aligned} 9) \quad & -4x - 7y = -15 \\ & -4x - 9y = -17 \end{aligned}$$

$$\begin{aligned} 10) \quad & -5x - 3y = 7 \\ & -2x - 3y = -8 \end{aligned}$$

$$(-5, 6) \text{ sub}$$

$$\begin{aligned} 11) \quad & 5x - y = 19 \\ & -9x - y = -9 \end{aligned}$$

$$\begin{aligned} 12) \quad & -2x + y = 0 \\ & -6x + y = 20 \end{aligned}$$

$$(-5, -10) \text{ sub}$$

$$\begin{aligned} 13) \quad & 10x = 18 + 8y \\ & -8y = -5x - 27 \end{aligned}$$

$$\begin{aligned} 14) \quad & 8y + 13 = 3x \\ & -8y = 9x + 25 \end{aligned}$$

$$(-1, -2) \text{ sub}$$

~~$$\begin{aligned} 15) \quad & 4 + y = -2y \\ & 16 + 8y - x = 0 \end{aligned}$$~~

~~$$\begin{aligned} 16) \quad & -12 + 8x = 6y \\ & -5y - 10 = 4x \end{aligned}$$~~

$$(0, -2)$$

$$\begin{array}{r} 2) \quad 6x - 4y = 6 \quad \textcircled{1} \\ + \quad -8x + 4y = 0 \quad \textcircled{2} \\ \hline -2x + 0 = 6 \\ -2x = 6 \\ x = \frac{6}{-2} \\ \boxed{x = -3} \end{array}$$

$$\begin{array}{r} 6x - 4y = 6 \\ 6(-3) - 4y = 6 \\ -18 - 4y = 6 \\ -4y = 6 + 18 \\ -4y = 24 \\ y = \frac{24}{-4} \\ \boxed{y = -6} \end{array}$$

$$\begin{array}{r} 2) \quad 6x - 4y = 6 \quad \textcircled{1} \\ + \quad -8x + 4y = 0 \quad \textcircled{2} \\ \hline -2x + 0 = 6 \\ -2x = 6 \\ x = \frac{6}{-2} \\ \boxed{x = -3} \end{array}$$

$$\begin{array}{r} 6x - 4y = 6 \\ 6(-3) - 4y = 6 \\ -18 - 4y = 6 \\ -4y = 6 + 18 \\ -4y = 24 \\ y = \frac{24}{-4} \\ \boxed{y = -6} \end{array}$$

$$8) \quad -3x + 5y = 12 \quad \textcircled{1}$$

$$-(-5x + 5y = 0) \quad \textcircled{2}$$

$$(-3x + 5x) + 0 = 12 - 0$$

$$2x = 12$$

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

$$\boxed{x = 6}$$

$$-3x + 5y = 12$$

$$-3(6) + 5y = 12$$

$$-18 + 5y = 12$$

$$5y = 12 + 18$$

$$5y = 30$$

$$\boxed{y = 6}$$

$$\begin{array}{r} 8) \quad -3x + 5y = 12 \\ - \quad (-5x + 5y = 0) \\ \hline \end{array}$$

$$\begin{array}{r} 8) \quad -3x + 5y = 12 \\ + \quad 5x - 5y = 0 \\ \hline 2x = 12 \end{array}$$

$$\boxed{x = 6}$$

$$10) \begin{array}{r} -5x - 3y = 7 \\ -(-2x - 3y = -8) \end{array}$$

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

$$-3x = 15$$

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

$$\boxed{x = -5}$$

$$-5x - 3y = 7$$

$$-5(-5) - 3y = 7$$

$$25 - 3y = 7$$

$$-3y = 7 - 25$$

$$-3y = -18$$

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

$$\boxed{y = +6}$$

