

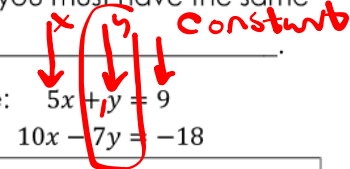
Good morning!

1. "Here"
2. Notes on Elimination
3. Practice p. 16-19 upload to CTLS
4. Quiz Review (Quiz opens today)

$$\begin{aligned} 2x + y &= -10 \\ 2x - 5y &= 6 \end{aligned}$$
$$y = -2x + 10$$
$$\left( \frac{14}{3}, \frac{2}{3} \right)$$
$$y = -2 \left( \frac{14}{3} \right) + 10$$
$$y = -\frac{28}{3} + \frac{10}{1}$$
$$= -\frac{28}{3} + \frac{30}{3}$$
$$y = \frac{2}{3}$$
$$2x - 5(-2x + 10) = 6$$
$$2x + 10x - 50 = 6$$
$$12x - 50 = 6$$
$$\begin{array}{r} 12x - 50 = 6 \\ +50 +50 \\ \hline 12x = 56 \\ \frac{12x}{12} = \frac{56}{12} \end{array}$$
$$x = \frac{14}{3}$$

Solving Systems of Equations by Elimination

In order to eliminate <sup>one</sup> of the variables, you must have the same coefficient for that variable but with signs constant.



Steps

Example:  $5x + y = 9$   
 $10x - 7y = -18$

1) Align like-variables so that they are on top of each other (if necessary)	✓
2) Check to see if one of the variables can cancel – if so, skip to step 5	
3) Determine which variable would be easiest to cancel	y
4) Multiply one (or both) of the equations by a # (or #s) so that one of the variables will cancel (so they will have the same coefficient but with opposite signs)	$\begin{array}{r} > (5x + y = 9) \\ 3(5x + y = 9) \\ + 10x - 7y = -18 \\ \hline \end{array}$
5) Add the 2 equations together	$\frac{45x}{45} = \frac{45}{45} \quad x = 1$
6) Solve for the variable that did NOT cancel	$\boxed{x = 1}$
7) Take the variable you solved for from step 6 and plug it into one of the original equations. Then solve for the remaining variable	$\begin{array}{r} 5x + y = 9 \\ 5(1) + y = 9 \\ 5 + y = 9 \\ -5 \quad -5 \\ \hline y = 4 \end{array}$
8) State solution as an ordered pair	$\boxed{(1, 4)}$

Examples: SAME #  
opposite sign

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

$$\begin{array}{r} 4x = -4 \\ \hline x = -1 \end{array}$$

$2(-1) + 2y = 4$   $y = 3$

$$\begin{array}{r} -2 + 2y = 4 \\ +2 \quad +2 \\ \hline 2y = 6 \end{array}$$

$(-1, 3)$

2)  $3x + 2y = 7$   
 $-3x + 4y = 5$

$$\begin{array}{r} 0 + 6y = 12 \\ \hline y = 2 \end{array}$$

$3x + 2(2) = 7$   
 $3x + 4 = 7$   
 $-4 \quad -4$   
 $\hline 3x = 3$   
 $\frac{3x}{3} = \frac{3}{3}$   
 $x = 1$

$(1, 2)$

3)  $-6x - 5y = -4$   
 $-7y + 6x = -20$

$$\begin{array}{r} -12y = -24 \\ \hline y = 2 \end{array}$$

$x = -1$   
 $(-1, 2)$

$-5(2) - 6x = -4$   
 $-10 - 6x = -4$   
 $+10 \quad +10$   
 $\hline -6x = 6$   
 $\frac{-6x}{-6} = \frac{6}{-6}$   
 $x = -1$

4)  $4x + 10y = -4$   
 $-10y + 25x = 120$

$(4, -2)$

5)  $8x + y = -16$   
 $-3x + y = -5$

$(9, 5)$

6)  $-4x + 9y = 9$   
 $-3y + x = -6$

$$\begin{array}{r} 4x - 12y = -24 \\ -4x + 9y = 9 \\ \hline -3y = -15 \\ \hline y = 5 \end{array}$$

$-4x + 9(5) = 9$   
 $-4x + 45 = 9$   
 $-45 \quad -45$   
 $\hline -4x = -36$   
 $\frac{-4x}{-4} = \frac{-36}{-4}$   
 $x = 9$

Solving Systems of Equations by Elimination Practice

Solve each system by elimination.

1)  $8x - 4y = -20$   
 $8x + 4y = 4$

2)  $10x - 2y = 2$   
 $-10x + 7y = 18$

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$5y = 20$   
 $\frac{5y}{5} = \frac{20}{5}$   
 $y = 4$

$10x - 2(4) = 2$   
 $10x - 8 = 2$   
 $+8 +8$

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$10x = 10$   
 $\frac{10x}{10} = \frac{10}{10}$   
 $x = 1$

**(1, 4)**

3)  $-6x - y = -21$   
 $6x + 2y = 24$

4)  $3x + 2y = 5$   
 $3x + 9y = -9$

5)  $-6x + 8y = -30$   
 $5x + 8y = -19$

*Same # opp sign*

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$6x - 8y = 30$

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$11x = 11$   
 $\frac{11x}{11} = \frac{11}{11}$   
 $x = 1$

**(1, -3)**

$5(1) + 8y = -19$   
 $5 + 8y = -19$   
 $-5 -5$

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$8y = -24$   
 $\frac{8y}{8} = \frac{-24}{8}$   
 $y = -3$

6)  $3x - 7y = -4$   
 $x - 7y = -6$

4)  $\begin{cases} 3x + 2y = 5 \\ 3x + 9y = -9 \end{cases}$

$(3, -2)$

Elimination

$$\begin{array}{r} -27x - 18y = -45 \\ 6x + 18y = -18 \\ \hline -21x = -63 \\ \frac{-21x}{-21} = \frac{-63}{-21} \end{array}$$

$x = 3$

$$\begin{array}{r} 3(3) + 2y = 5 \\ 9 + 2y = 5 \\ -9 \quad -9 \\ \hline 2y = -4 \\ \frac{2y}{2} = \frac{-4}{2} \end{array}$$

$y = -2$

Substitution

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

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

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

$$3x + 9\left(\frac{-3x + 5}{2}\right) = -9$$

$$3x - \frac{27}{2}x + \frac{45}{2} = -9$$

$$\frac{-21x + 45}{2} = \frac{-18}{2}$$

$$\frac{-45}{2} = \frac{-45}{2}$$

$$\frac{-21x}{2} = \frac{-63}{2}$$

$$\frac{-21x}{-21} = \frac{-63}{-21}$$

$x = 3$

$$3x + 2y = 5$$

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

$$9 + 2y = 5$$

$$-9 \quad -9$$

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

$y = -2$

Graphing

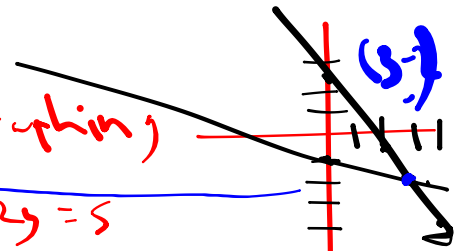
$$3x + 2y = 5$$

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

$$\begin{array}{r} 3x + 9y = -9 \\ -3x \quad -9 \\ \hline 9y = -9 \\ \frac{9y}{9} = \frac{-9}{9} \end{array}$$

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

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



$$\begin{array}{r} 4) -1(3x + 2y = 5) \\ \quad 3x + 9y = -9 \\ \quad \underline{-3x - 2y = -5} \\ \quad \quad 7y = -14 \\ \quad \quad \quad \frac{7}{7} \\ \quad \quad \quad \boxed{y = -2} \end{array}$$

This time, eliminate  $x$   
 $(3, -2)$

$$\begin{array}{r} 3x + 2(-2) = 5 \\ 3x - 4 = 5 \\ \quad +4 \quad +4 \\ \hline 3x = 9 \\ \frac{3}{3} \quad \frac{9}{3} \\ \boxed{x = 3} \end{array}$$

7)  $5x + 2y = 30$   
 $-15x + 6y = 30$

8)  $-10x - 2y = 21$   
 $20x + 4y = -28$

~~Handwritten notes and calculations:~~  
 $y = -5x - \frac{21}{2}$   
 $y = -5x - 7$   
 Same slope  
 diff. y-int.  
 parallel  
 No solution  
 $0 = 14$   
 $\# = \text{diff. \#}$

9)  $6x - 8y = -22$   
 $-2x - 16y = 26$

10)  $7x - 6y = -18$   
 $9x - 5y = 4$

11)  $-5x + 6y = -23$   
 $-4x + 7y = -14$

12)  $-4x + 20y = 8$   
 $-10x + 50y = 20$



## Solving Systems of Equations – Matching

Solve the following using any method. Once you solve each system, record the letter that corresponds to the answer in the blank provided. Each answer will only be used once. There are blank graphs provided if you wish to graph.

Answers:

A: (24, 3)

B: (8, 4)

C: (12, 17)

D: No Solution

E: (2, 1)

F: (3, 5)

G: (8, 2)

H: (-6, -1)

I: (4, 1)

J: Infinitely Many Solutions

1)  $x - 2y = 0$       Answer: \_\_\_\_\_  
 $2x - 5y = -4$

2)  $y = 8 - x$       Answer: \_\_\_\_\_  
 $4x - 3y = -3$

3)  $y = x + 5$       Answer: \_\_\_\_\_  
 $y = 2x - 7$

4)  $x + y = 3$       Answer: \_\_\_\_\_  
 $2x + 2y = 6$

5)  $x + 3y = 14$       Answer: \_\_\_\_\_  
 $-5x + 6y = -28$

6)  $-2x + 6y = 6$       Answer: \_\_\_\_\_  
 $y = 2x + 11$

7)  $x = 8y$       Answer: \_\_\_\_\_  
 $x - 4y = 12$

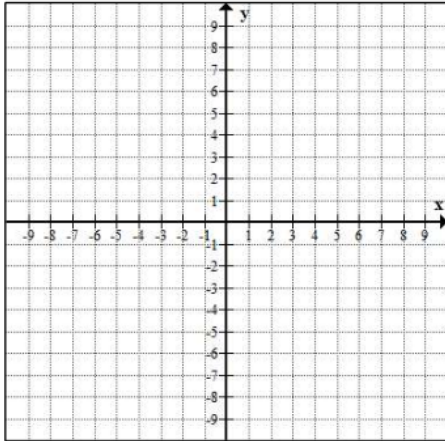
8)  $4x - y = 7$       Answer: \_\_\_\_\_  
 $5x - 8y = 2$

9)  $y = 2x - 3$       Answer: \_\_\_\_\_  
 $-2x + y = 6$

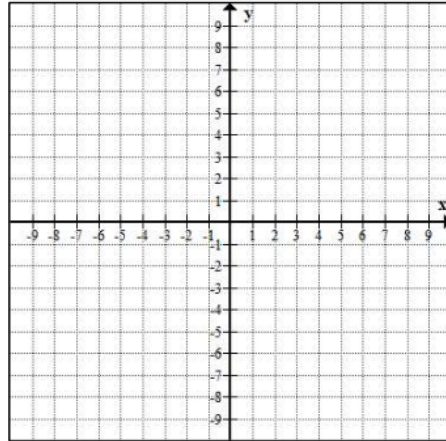
10)  $-3x - y = -13$       Answer: \_\_\_\_\_  
 $x + 2y = 6$

If you decide to use a graph, please number them.

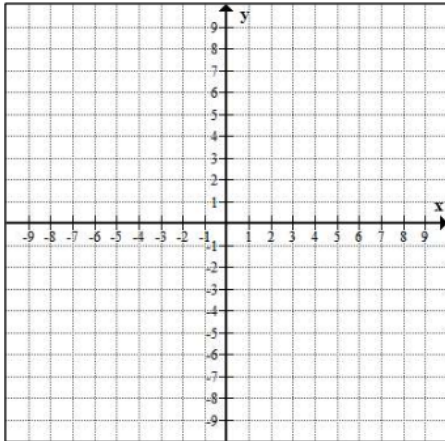
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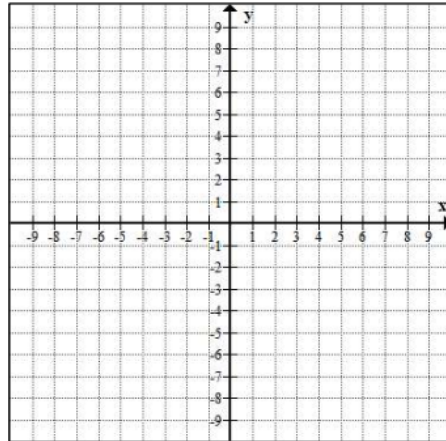
# \_\_\_\_\_



# \_\_\_\_\_



# \_\_\_\_\_



Extra Room for Scratch Work: