

Unit 6: Systems Of Equations

Name: _____

Goals:

Target A: I can solve systems with substitution.

Target B: I can solve systems with elimination.

Target C: I can solve systems by creating a graph

Target D: I can write systems of equations that model situations.

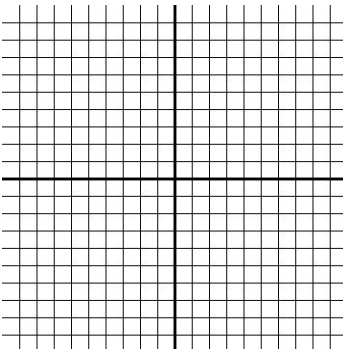
Target E: I can identify if a system of equations has 1 solution, infinite solutions or no solutions.

Resources:

<http://mrnohner.com/systems.html>

Missing Targets:

1.	Intersection	a. A method for solving a system of linear equations in which the equivalent expression of a variable is substituted for that variable
2.	Elimination Method	b. The rate at which the y value of a linear function rises or falls as x increases.
3.	Slope	c. Two lines that are co-planar and never intersect
4.	Parallel	d. The number that is multiplied by the variable
5.	Graphing Method	e. An equation that when graphed will form a line.
6.	A System Solution	f. A method where you graph both lines to find the point of intersection which will be the solution to the system.
7.	Substitution Method	g. The point of intersection for a system of equations.
8.	Linear Equation	h. Where two lines cross at a point
9.	Coefficient	i. Method of solving a system in which two equations are added together in a manner that will eliminate one of the two variables

I can solve systems with substitution. 1) There will be one equation where either 'x' or 'y' will be isolated. Substitute that equation in for that value in the other equation. 2) Your new equation should have only one variable type. Solve for it. 3) Now you know either x or y, plug in what you know to either equation to solve for the other value.	$y = 5x - 4$ $5x - 5y = 0$
I can solve systems with elimination. 1) You need to make sure the coefficients (the numbers in front of the 'x' or 'y') are equal and opposite before we add the equations together. Multiply one or both of the equations to make this happen. 2) Add the two equations together, one variable should be eliminated, solve your new equation for the other. 3) Plug in the variables you know to either equation to solve for the other one.	$-7x + 2y = -25$ $10x + 10y = 10$
I can solve systems by creating a graph 1) Graph each equation 2) There should be a point where the two lines cross (unless the system has no solution). That point is your solution!	 $y = -\frac{5}{2}x + 3$ $y = \frac{1}{2}x - 3$

I can write systems of equations that model situations.	The school that Rob goes to is selling tickets to a play. On the first day of ticket sales the school sold 2 senior citizen tickets and 2 child tickets for a total of \$40. The school took in \$56 on the second day by selling 4 senior citizen tickets and 1 child ticket. What is the price each of one senior citizen ticket and one child ticket?
I can identify if a system of equations has 1 solution, infinite solutions or no solutions. 1) No Solution when: 2) Infinite Solutions when:	$12x - 14y = 18$ $6x - 7y = 9$ $y = -3x - 6$ $-3x - y = -7$
I can identify and apply which method is most appropriate to solve a systems of equations. 1) Elimination when: 2) Substitution when: 3) Graphing when:	$-7x + 2y = -25$ $10x + 10y = 10$ $y = 5x - 4$ $5x - 5y = 0$ $y = -\frac{5}{2}x + 3$ $y = \frac{1}{2}x - 3$

Guide notes

Title:	Date:
Goal:	
Notes:	
You own your own business and sell hammocks and beach chairs. You have to order new supplies for the week, but you don't want to over order. In the past you sell twice as many hammocks as beach chair. Each beach chair costs 30 dollars to order and each hammock costs 40. Your overall budget is \$3520. How many of each should you order?	
Summary:	

Guide notes

Title:	Date:
Goal:	
Notes:	
You are hosting the homecoming dance and need to decide how much food to order. Costco hot-dogs cost 1.50 and their pizza slices cost 2 dollars. You expect 300 people to come to the dance and you figure that everyone will eat 1 item. Your budget is \$540. How many hotdogs and pizza slices should you order?	
Summary:	

Guide notes

Title:	Date:
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Guide notes

Title:	Date:
Goal:	
Notes:	
Your brother is eating Oreos and you decide to challenge him to a little race. He has already eaten 24, but is only eating 2 per minute. You figure you can eat 5 per minute. When will you catch him?	
You have 152 dollars and are saving 20 bucks every week for a new Xbox. The issue is that the newest Xbox costs 400 dollars and the systems are getting more expensive by an average of 11 dollars a week	
Summary:	

Guide notes

Title:	Date:
Goal:	
Notes:	
The admission fee at the football game last week was \$1.50 for children and \$4.00 for adults. 2200 people entered and \$5050 is collected. How many children and how many adults attended?	
You spend the day catching and tagging great white sharks and whitetip reef sharks. You caught three times the amount of whitetip sharks as you did great white sharks. Typically a great white weighs near 3000 pounds and a white tip weighs 825 pounds. If the total 98550 pounds of shark were tagged, then how many of each type would you predict were tagged?	
Summary:	

Guide notes

Title:	Date:
Goal:	
Notes:	
The school that Elisa goes to is selling tickets to a fall musical. On the first day of ticket sales the school sold 14 senior citizen tickets and 13 student tickets for a total of \$216. The school took in \$128 on the second day by selling 2 senior citizen tickets and 14 student tickets. What is the price each of one senior citizen ticket and one student ticket?	
You have a pocket full of change. Total you have \$9.75. Each dime is worth ten cents and each nickel is worth 5 cents. Total you have 175 coins. How many of each type do you have?	
Every year for New Years I promise myself I'll do more pushups. Together me and my wife have done 2168 push-ups. I think she has done 3 times as many as me though... So how many has she done and how many have I done?	
Summary:	

Guide notes

Title:	Date:
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Guide notes

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Guide notes

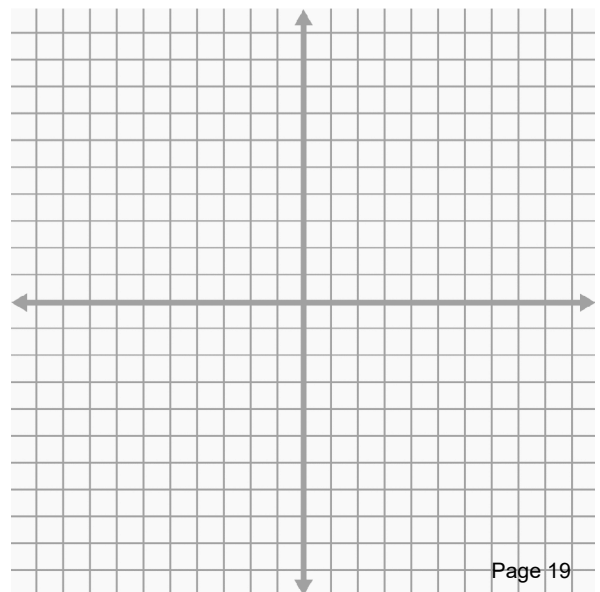
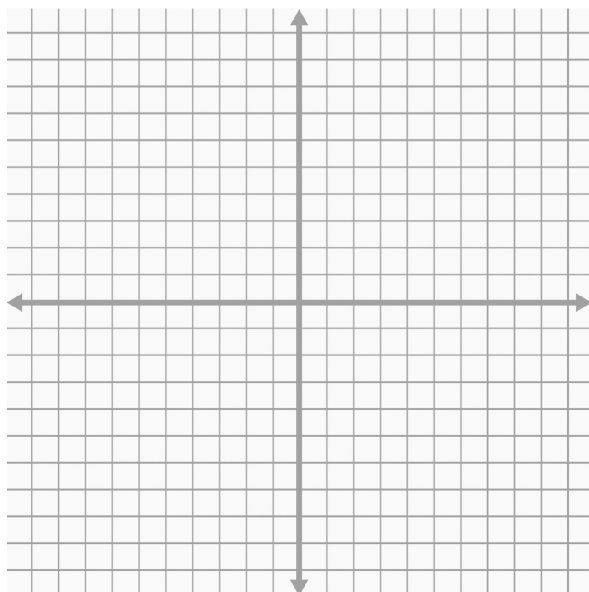
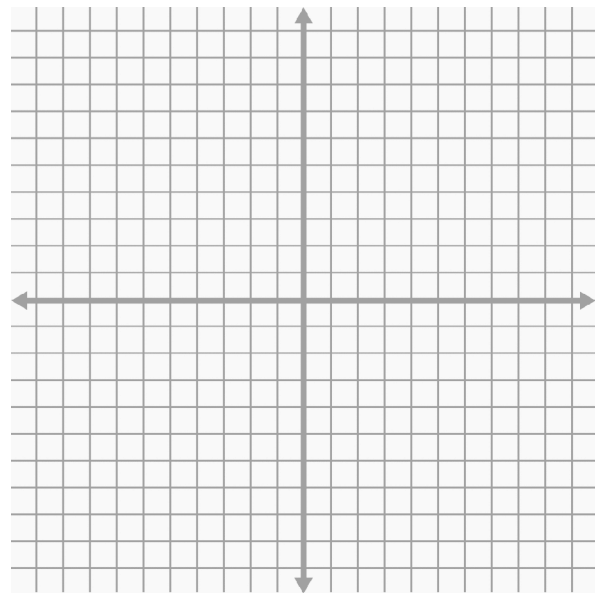
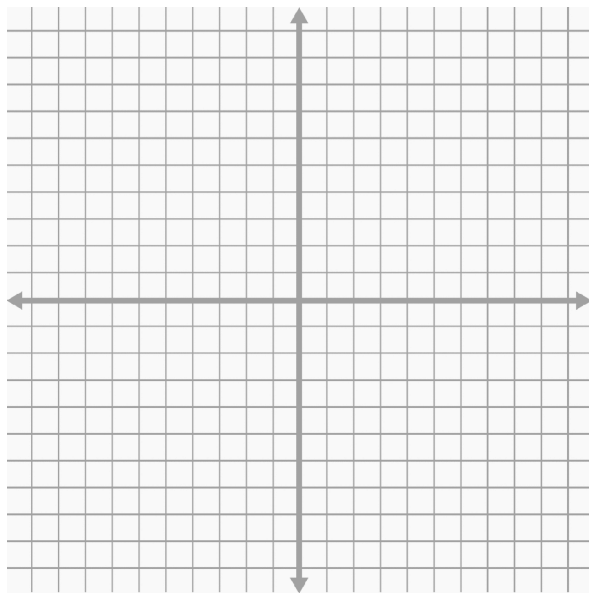
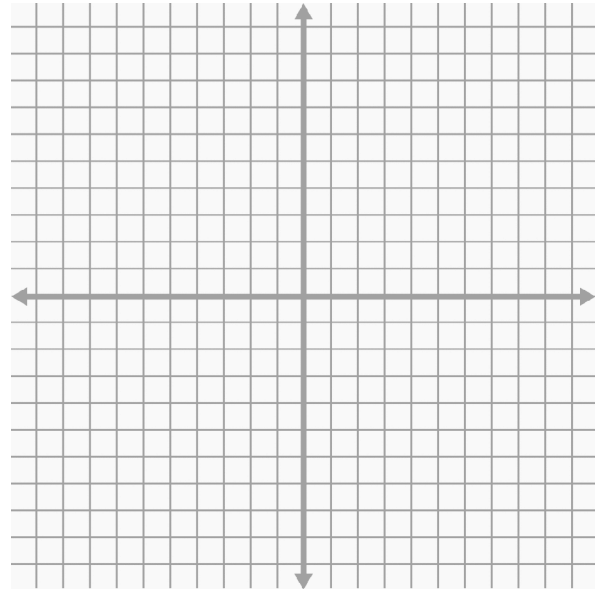
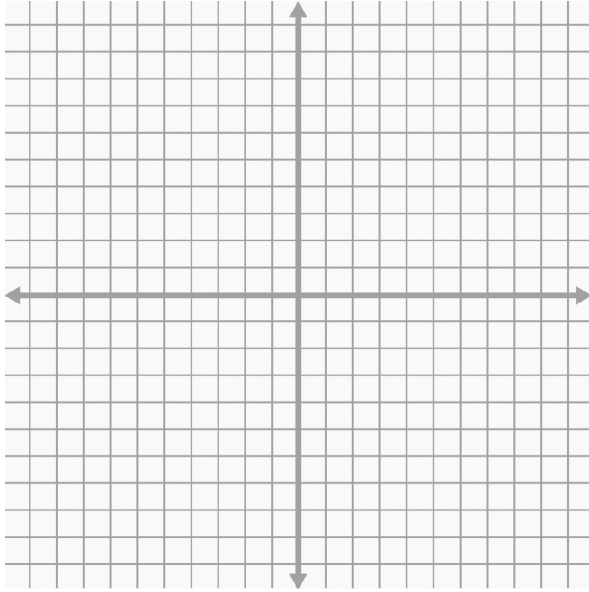
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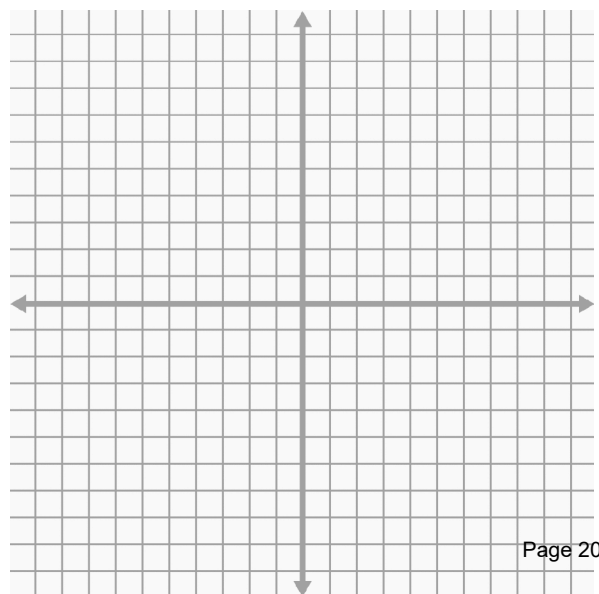
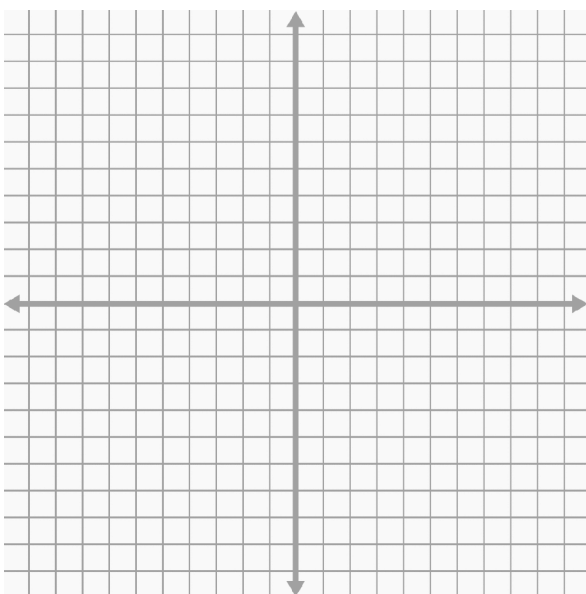
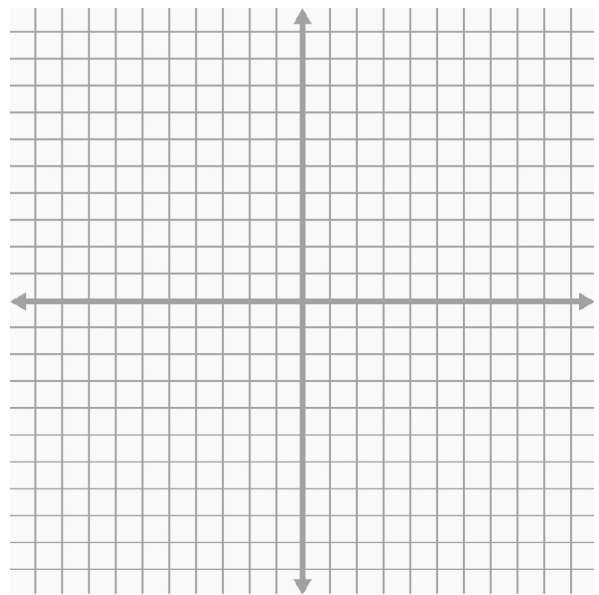
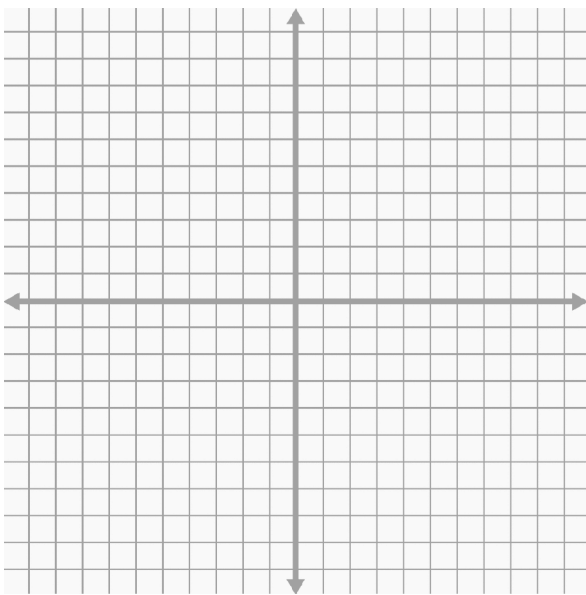
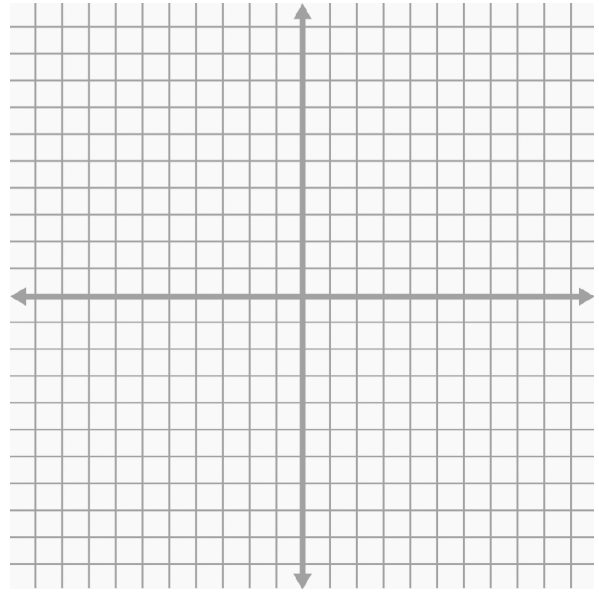
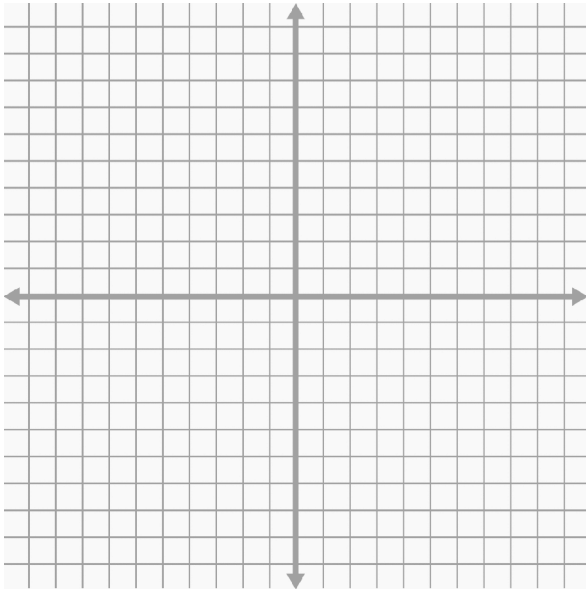
Guide notes

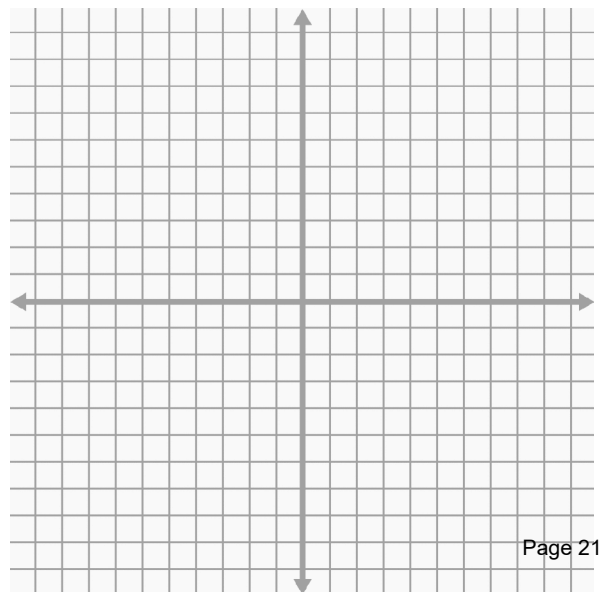
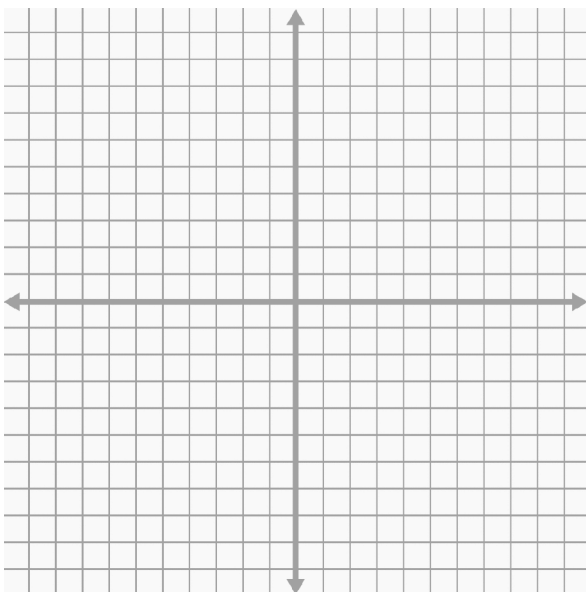
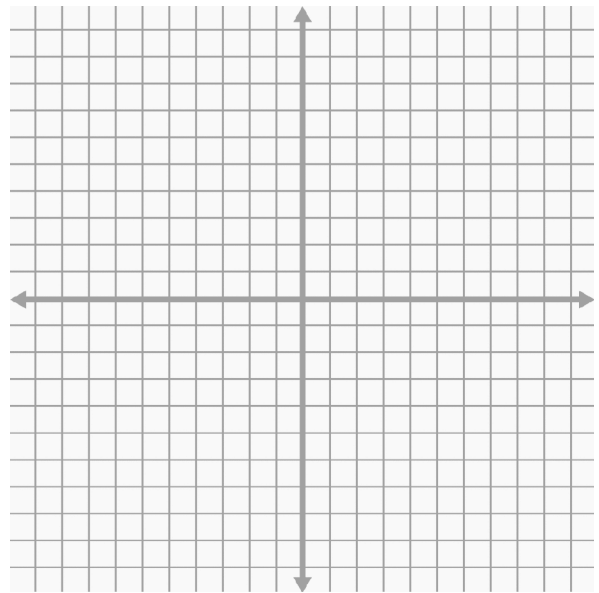
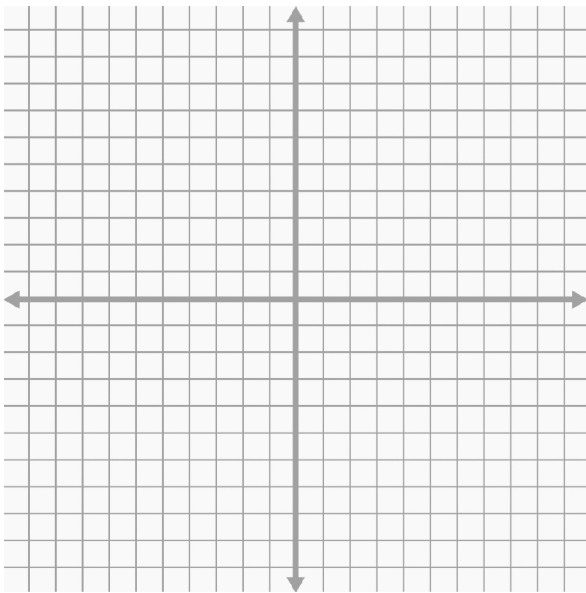
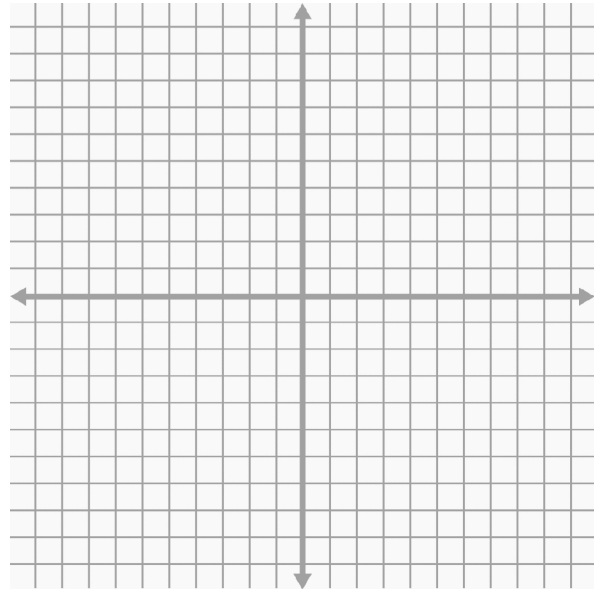
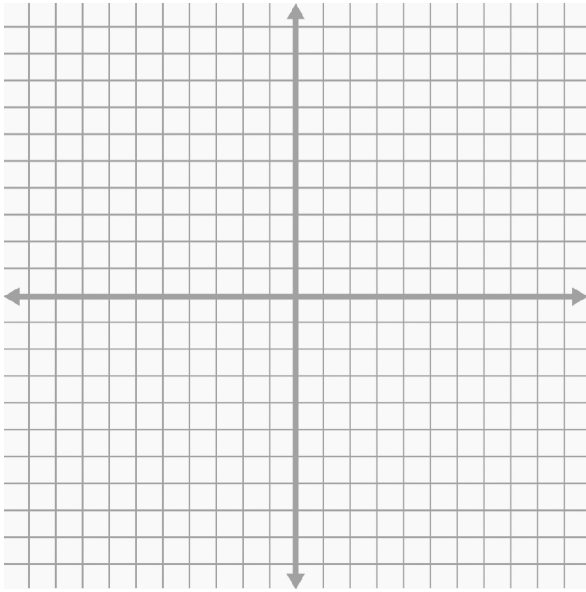
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Substitution (Remember to solve for X and Y)

Solve each system by substitution.

1) $-5x - 4y = 9$
 $y = 4x - 18$

2) $y = -6x + 16$
 $3x + 4y = 22$

3) $y = 4x - 1$
 $y = -4x - 1$

4) $y = x - 5$
 $2x - 5y = 1$

$$\begin{aligned} 5) \quad y &= -5x - 8 \\ y &= -8x - 14 \end{aligned}$$

$$\begin{aligned} 6) \quad y &= 6x + 10 \\ -x - 3y &= -11 \end{aligned}$$

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

$$\begin{aligned} 8) \quad 6x + 5y &= -23 \\ y &= 6x + 17 \end{aligned}$$

$$\begin{aligned} 9) \quad y &= 7x + 9 \\ 6x - 6y &= 18 \end{aligned}$$

$$\begin{aligned} 10) \quad y &= -3x + 19 \\ 2x - y &= 21 \end{aligned}$$

Solving Systems By Elimination

Solve each system by elimination.

$$\begin{array}{l} 1) \quad -8x - 3y = 16 \\ \quad \quad 2x + 3y = 14 \end{array}$$

$$\begin{array}{l} 2) \quad -6x - 6y = -12 \\ \quad \quad 6x + 3y = -12 \end{array}$$

$$\begin{array}{l} 3) \quad 5x + 5y = 15 \\ \quad \quad 5x - 9y = 1 \end{array}$$

$$\begin{array}{l} 4) \quad 5x - 7y = 19 \\ \quad \quad 3x - 7y = 17 \end{array}$$

$$\begin{array}{l} 5) \quad 7x + 4y = -4 \\ \quad \quad -8x - 12y = 12 \end{array}$$

$$\begin{array}{l} 6) \quad -5x - 2y = -6 \\ \quad \quad -15x + 3y = 9 \end{array}$$

$$\begin{aligned} 7) \quad & 8x - 7y = -21 \\ & 4x - 6y = -18 \end{aligned}$$

$$\begin{aligned} 8) \quad & -5x - y = 21 \\ & x + 7y = 23 \end{aligned}$$

$$\begin{aligned} 9) \quad & -x - 2y = -24 \\ & -10x + y = -30 \end{aligned}$$

$$\begin{aligned} 10) \quad & 4x + 16y = 8 \\ & -2x + 8y = 12 \end{aligned}$$

$$\begin{aligned} 11) \quad & 7x - 6y = -9 \\ & 5x - 7y = -1 \end{aligned}$$

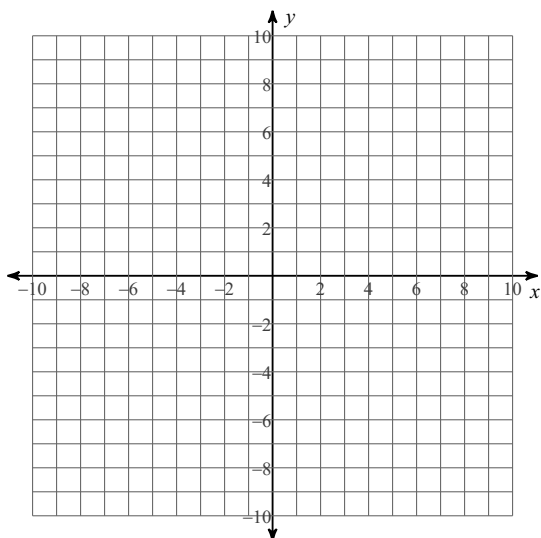
$$\begin{aligned} 12) \quad & 3x + 10y = 14 \\ & -5x + 9y = 28 \end{aligned}$$

Solving Systems By Graphing

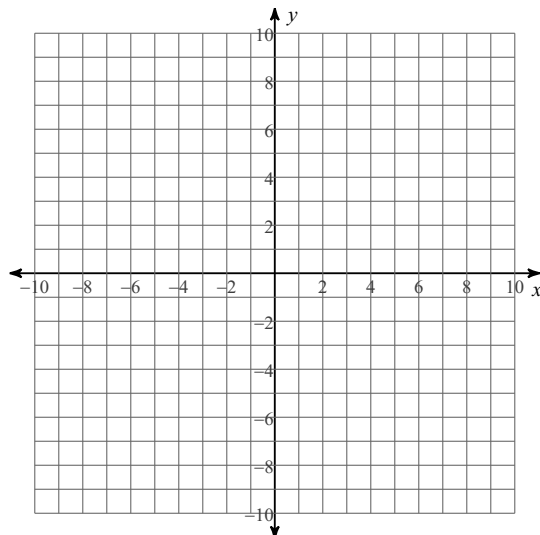
Solve each system by graphing.

1) $y = -\frac{3}{8}x + 8$

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

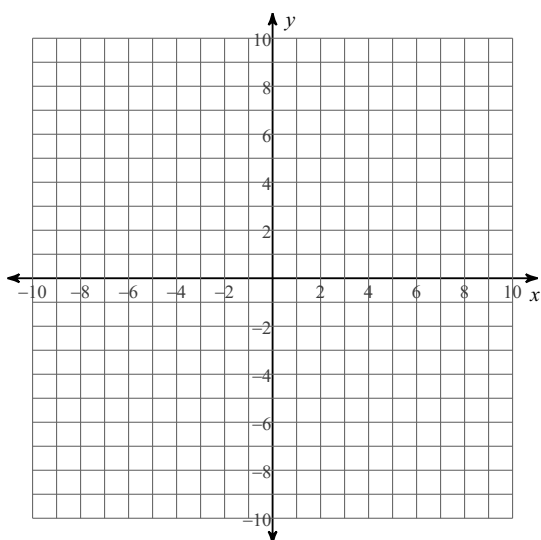


2) $y = 13x + 9$
 $y = -2x - 6$



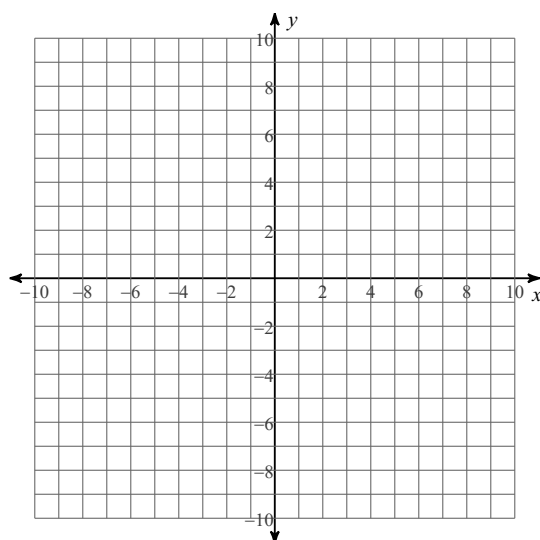
3) $y = -\frac{4}{9}x - 7$

$y = \frac{5}{9}x + 2$



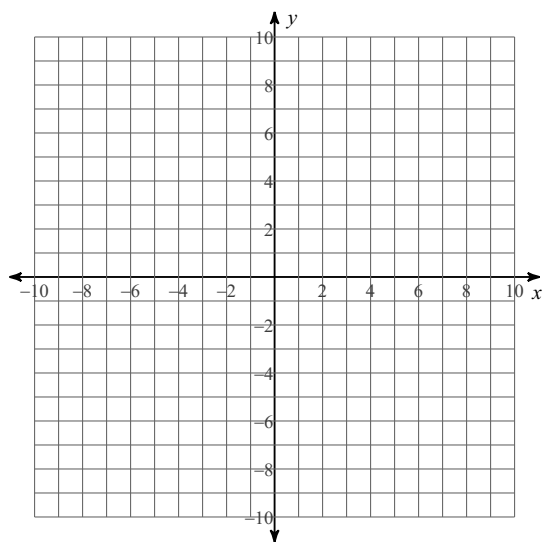
4) $y = -\frac{1}{2}x + 9$

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



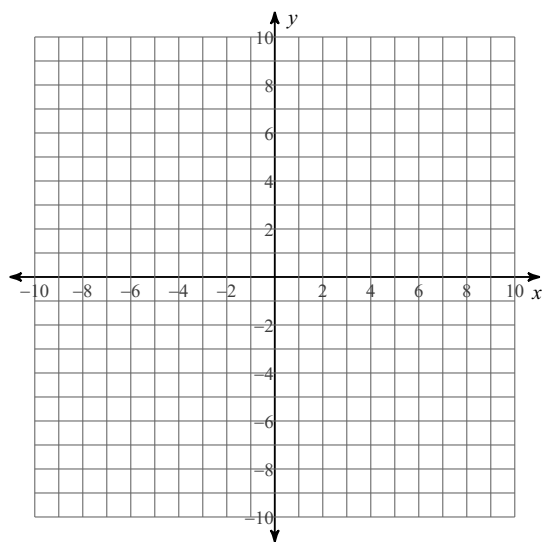
$$5) \ y = -\frac{1}{6}x - 1$$

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



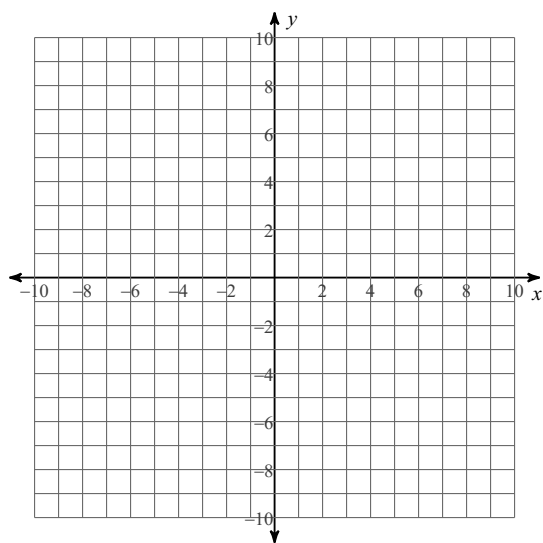
$$6) \ y = -\frac{1}{2}x + 3$$

$$y = -\frac{13}{4}x - 8$$



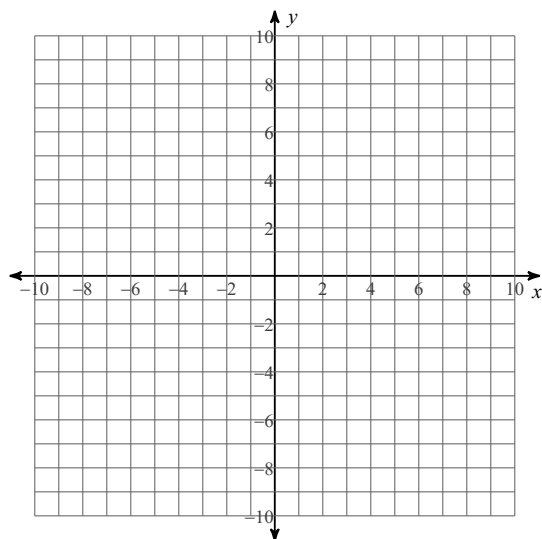
$$7) \ y = 2x - 6$$

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



$$8) \ y = -\frac{11}{8}x - 9$$

$$y = \frac{3}{4}x + 8$$



Picking a Method

Pick the best method and solve each system! Attach a piece of graph paper for those systems you choose to solve by graphing.

1) $7x + 12y = -16$
 $6x + 4y = -20$

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

3) $-8x + 2y = 16$
 $-9x + 8y = -5$

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

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

6) $-5x - 2y = -5$
 $y = -4x + 7$

$$\begin{aligned} 7) \quad & 6x - 5y = 7 \\ & -4x - 4y = -12 \end{aligned}$$

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

$$\begin{aligned} 9) \quad & -16x - y = -29 \\ & 8x + 9y = -11 \end{aligned}$$

$$\begin{aligned} 10) \quad & -5x + 5y = 5 \\ & 2x - 3y = -6 \end{aligned}$$

$$\begin{aligned} 11) \quad & y = -5x + 7 \\ & 8x + 4y = -8 \end{aligned}$$

$$\begin{aligned} 12) \quad & y = 2x + 3 \\ & y = -\frac{3}{2}x - 4 \end{aligned}$$

$$\begin{aligned} 13) \quad & y = 2x - 2 \\ & -4x - 8y = 16 \end{aligned}$$

$$\begin{aligned} 14) \quad & 6x + 7y = 2 \\ & -4x - 10y = 20 \end{aligned}$$

Solving Systems with "Infinite" or "No Solutions"

Solve each system (show work) and determine if there are
"No Solutions" or "Infinite Solutions"

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

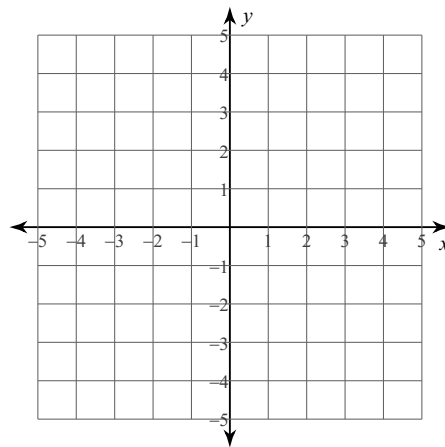
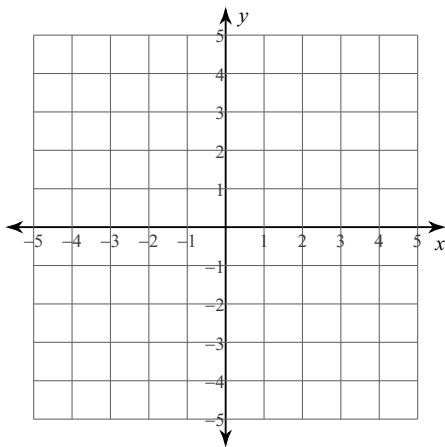
2) $4x + 2y = -6$
 $6x + 3y = -2$

3) $y = 4x + 7$
 $-8x + 2y = -8$

4) $y = -2x - 17$
 $-4x - 2y = 34$

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

6) $y = -\frac{7}{3}x - 3$
 $y = -\frac{7}{3}x - 2$



- 4) The senior classes at High School A and High School B planned separate trips to New York City. The senior class at High School A rented and filled 7 vans and 3 buses with 182 students. High School B rented and filled 14 vans and 7 buses with 399 students. Every van had the same number of students in it as did the buses. Find the number of students in each van and in each bus.
- 5) Gabriella and Emily are selling pies for a school fundraiser. Customers can buy apple pies and lemon meringue pies. Gabriella sold 4 apple pies and 13 lemon meringue pies for a total of \$302. Emily sold 8 apple pies and 11 lemon meringue pies for a total of \$334. What is the cost each of one apple pie and one lemon meringue pie?
- 6) Two small pitchers and one large pitcher can hold 8 cups of water. One large pitcher minus one small pitcher constitutes 2 cups of water. How many cups of water can each pitcher hold?
- 7) A test has twenty questions worth 100 points. The test consists of True/False questions worth 3 points each and multiple choice questions worth 11 points each. How many multiple choice questions are on the test?

Systems of Equations Practice Test

Solve using *Substitution* or *Elimination*.

1) $3x - 9y = 24$
 $2x + 9y = 1$

2) $4x - 8y = 24$
 $y = 2x - 12$

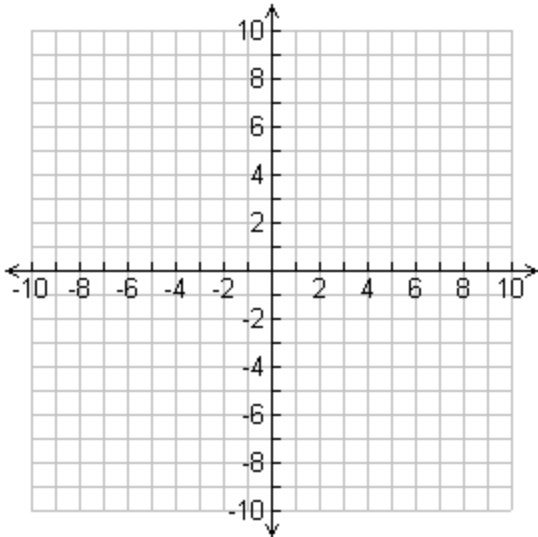
3) $3x - 2y = 7$
 $2x - 5y = 12$

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

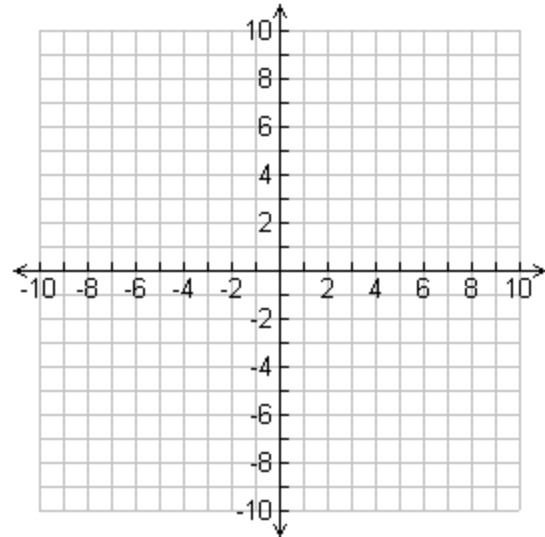
5) $y = \frac{1}{2}x + 17$
 $x + 6y = 86$

6) $y = 5x + 1$
 $3y - 15x = 7$

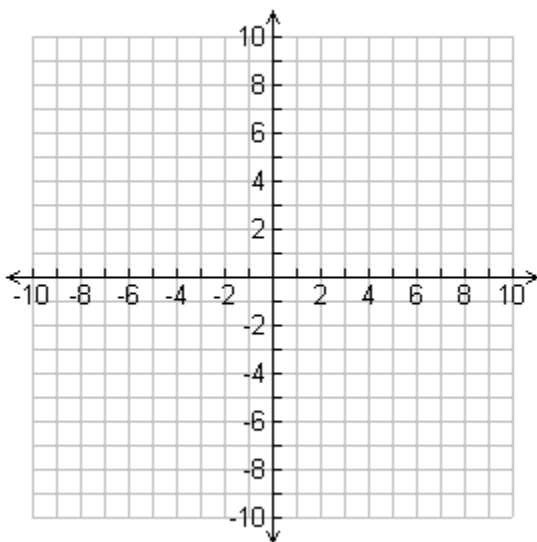
7) $y = 3x - 10$
 $y = -\frac{1}{2}x + 4$



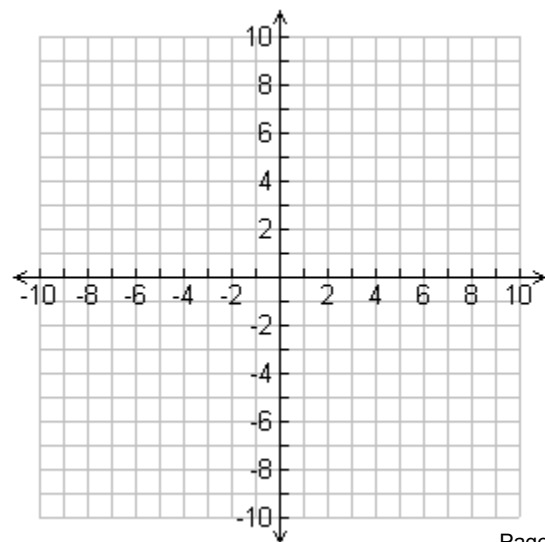
8) $y = -\frac{1}{5}x$
 $y = \frac{2}{3}x + 6$



9) $2x - 4y = 8$
 $y = -\frac{1}{3}x + 3$



10) $2x - 3y = 12$
 $y = \frac{2}{3}x + 1$



11) There are some red and yellow weights on the table next to a scale. If you put 7 red weights and 6 yellow weights on the scale it reads 110 pounds. So you remove 5 red weights and 2 yellow weights and now it reads 44 pounds.

a) What are the equations that model this situation?

b) How much does each weigh?

12) Your watch tracks how many calories you've burned doing different activities. After boxing for 2 hours and running for 1 hour your watch says you have burned 2050 calories. Yesterday you boxed for 1 hour and ran for 2 hours and your watch said you burned 1850 calories.

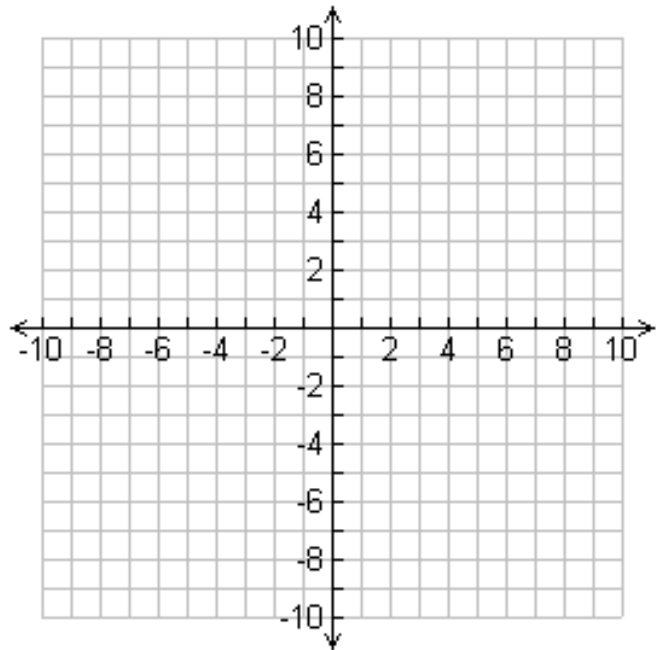
c) What are the equations that model this situation?

d) How much does each activity burn in an hour?

Systems of Equations: Challenge Problems

- 1) What is the area of a circle? What is the circumference of a circle? Can you find the radius for a circle that has the same circumference and area using the substitution method?

- 2) $y = x^2 - 3x + 1$ will make a shape called a parabola. In this chapter when lines cross we found out we had ONE solution. With a parabola you can have TWO solutions. Can you find the equation of a line that has two non-decimal solutions when paired with the parabola given above?



- 3) A chemist has 70 mL of a 50% methane solution. How much of a 80% solution must she add so the final solution is 60% methane?

- 4) What does x , y , and z have to equal?

$$3x + 4y + z = 7$$

$$2x - 3y - z = 0$$

$$6x + 10y - 2z = 34$$

- 5) Create a system of equations that has infinite solutions. Show me how you know.

- 6) Create a three variable system of equations with zero solutions. Show me how you know.

Assignment #1: Solving Systems With Substitution

- | | | | |
|---------------|---------------|---------------|---------------|
| 1) $(3, -6)$ | 2) $(2, 4)$ | 3) $(0, -1)$ | 4) $(8, 3)$ |
| 5) $(-2, 2)$ | 6) $(-1, 4)$ | 7) $(-1, -1)$ | 8) $(-3, -1)$ |
| 9) $(-2, -5)$ | 10) $(8, -5)$ | | |

Assignment #2: Solving Systems With Elimination

- | | | | |
|--------------|---------------|----------------|---------------|
| 1) $(-5, 8)$ | 2) $(-6, 8)$ | 3) $(2, 1)$ | 4) $(1, -2)$ |
| 5) $(0, -1)$ | 6) $(0, 3)$ | 7) $(0, 3)$ | 8) $(-5, 4)$ |
| 9) $(4, 10)$ | 10) $(-2, 1)$ | 11) $(-3, -2)$ | 12) $(-2, 2)$ |

Assignment #3: Solving Systems By Graphing

- | | | | |
|----------------|---------------|---------------|--------------|
| 1) $(8, 5)$ | 2) $(-1, -4)$ | 3) $(-9, -3)$ | 4) $(2, 8)$ |
| 5) No Solution | 6) $(-4, 5)$ | 7) $(2, -2)$ | 8) $(-8, 2)$ |

Assignment #4: Picking A Method To Solve Systems

- | | | | |
|---------------|---------------|---------------|----------------|
| 1) $(-4, 1)$ | 2) $(-3, -3)$ | 3) $(-3, -4)$ | 4) $(-2, 8)$ |
| 5) $(3, -4)$ | 6) $(3, -5)$ | 7) $(2, 1)$ | 8) $(3, -1)$ |
| 9) $(2, -3)$ | 10) $(3, 4)$ | 11) $(3, -8)$ | 12) $(-2, -1)$ |
| 13) $(0, -2)$ | 14) $(5, -4)$ | | |

Assignment #5: Solving Systems With Infinite or No Solutions

- 1) Infinite Solutions 2) No Solutions 3) No Solutions 4) Infinite Solutions
5) No solutions 6) No solutions

Assignment #6: Word Problems (Systems)

- 1) windflower \$5, daffodil \$17 2) adult \$4 student \$14 3) 14 hotdogs, 16 pizza
4) 11 vans, 35 buses 5) apple pies \$17, lemon meringue pies \$18 6) small 2, large 4 7) 5 MC 15 TF

Assignment #7: Practice Test:

- 1) $(5, -1)$ 2) $(6, 0)$ 3) $(1, -2)$ 4) Infinite Solutions 5) $(-4, 15)$
6) No Solutions 7) $(4, 2)$ 8) $(-10, 2)$ 9) $(6, 1)$ 10) No solutions 11a) $7R + 6Y = 110$ & $2R + 4Y = 44$
11b) Red 11, Yellow 5.5 12a) $2B + 1R = 2050$ & $1B + 2R = 1850$ 12b) Running: 550 Boxing: 750

“The successful warrior is the average man, with laser-like focus.”

Bruce Lee

“Don’t let the fear of losing be greater than the excitement of winning.”

Robert Kiyosaki

“It is our choices, that show what we truly are, far more than our abilities.”

J. K Rowling

“The difference between a successful person and others is not a lack of strength, not a lack of knowledge, but rather a lack of will.”

Vince Lombardi

“I have not failed. I’ve just found 10,000 ways that won’t work.”

Thomas A. Edison

“Pain is temporary. It may last for a minute, or an hour or a day, or even a year. But eventually, it will subside. And something else take its place. If I quit, however, it will last forever.”

Eric Thomas