Name: _____

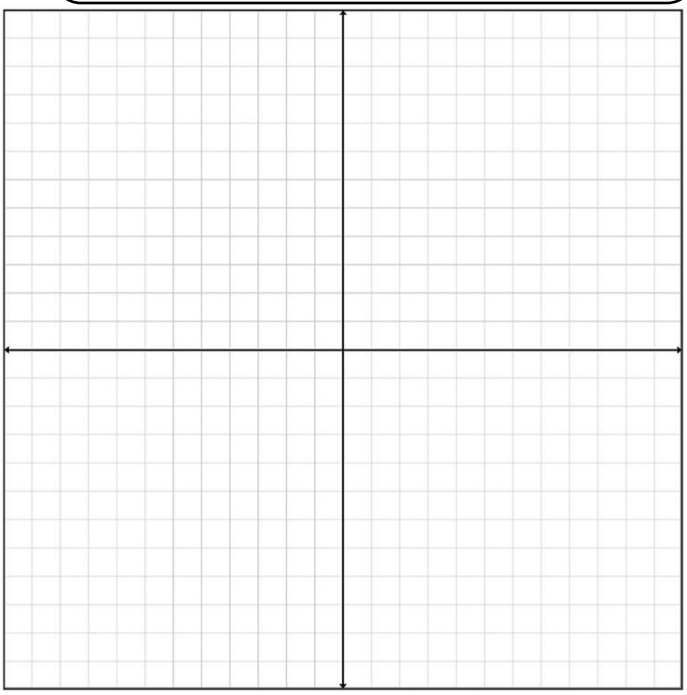
Algebra Unit 4: Systems of Linear Equations

SYSTEMS BY GRAPHING

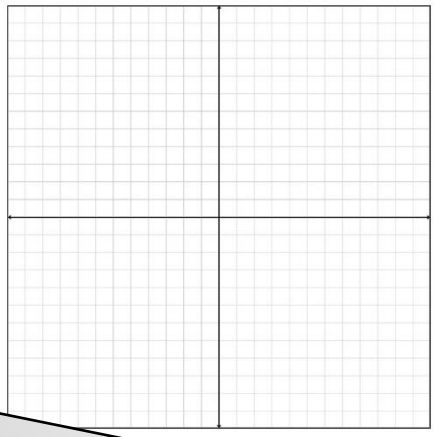
A solution is...

Equation 1:

Equation 2:

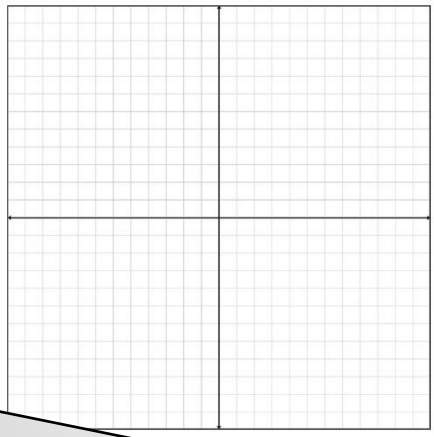


Different Slopes



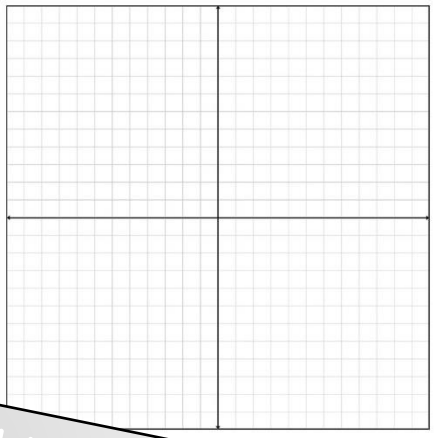
Solution?

Same Slope, Different Intercepts



Solution?

Same Slope, Same Intercept



Solution?

SYSTEMS BY SUBSTITUTION

I need....

Equation 1:

Equation 2:

Equation 1:

Equation 2:

Equation 1:

Equation 2:

SYSTEMS BY ELIMINATION

How do you eliminate a term?

Equation 1:

Equation 2:

Equation 1:

Equation 2:

Possible Solutions

One Solution

No Solution

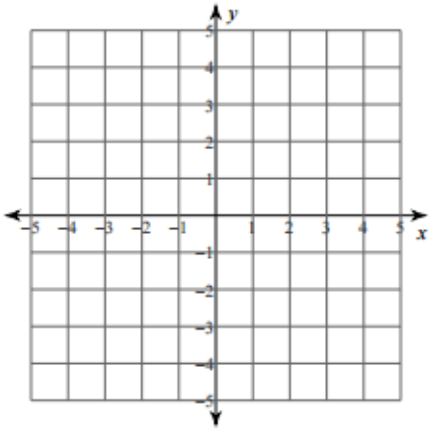
Infinitely Many Solutions

SYSTEMS BY GRAPHING

Solve each system by graphing.

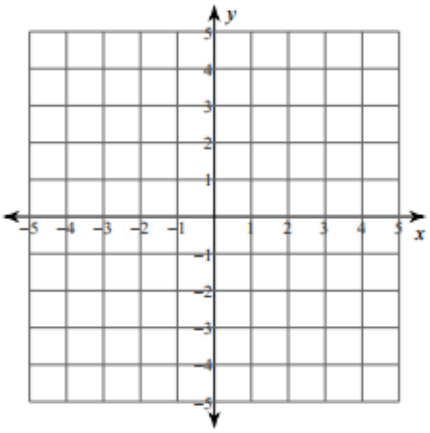
1) $y = -\frac{5}{3}x + 3$

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



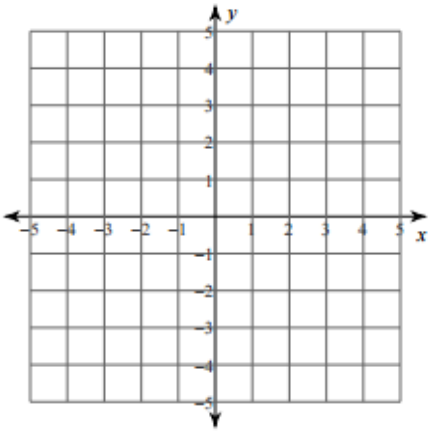
2) $y = 4x + 3$

$y = -x - 2$



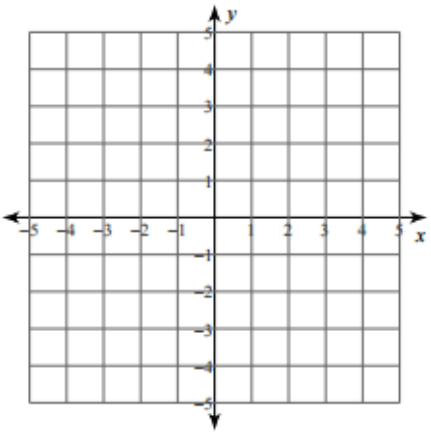
3) $y = -\frac{1}{2}x - 1$

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



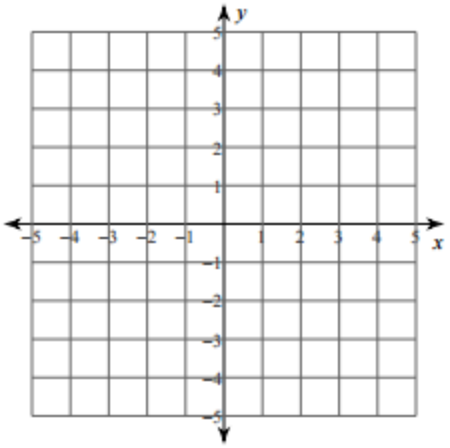
4) $y = -1$

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



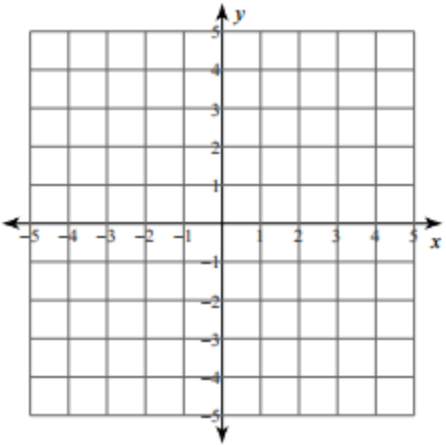
5) $y = 3x - 4$

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



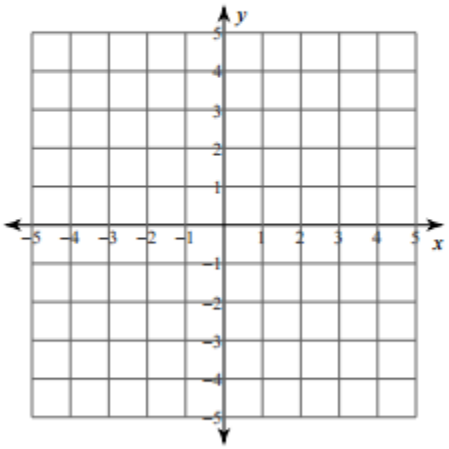
6) $y = -2x + 2$

$y = -2x - 2$



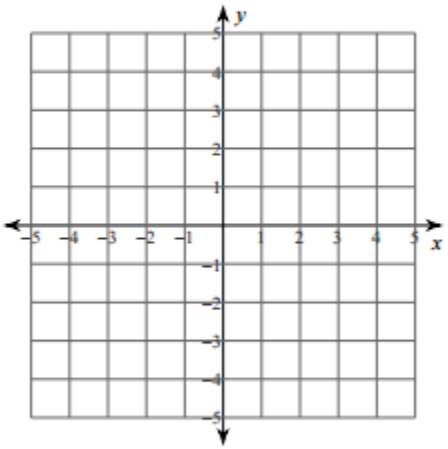
7) $y = -\frac{1}{2}x - 2$

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



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

$y = -x + 1$

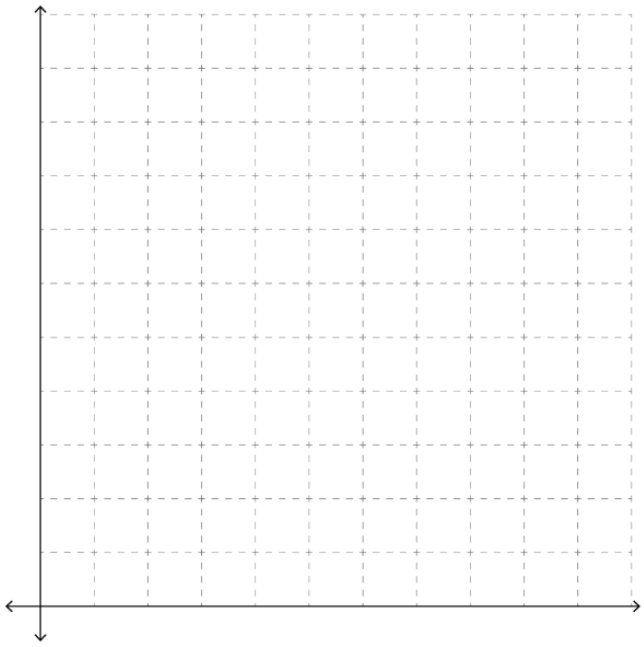


Talk and Text Plans: Real World Systems by Graphing

A cell phone company offers two talk and text plans. The company charges a monthly service fee of $20 for either plan the customer chooses:
Customers that choose Talk and Text Plan A are charged five cents a minute and twenty dollars for 250 texts.
Customers that choose Talk and Text Plan B are charged ten cents a minute and fifteen dollars for 200 texts.

a) Express each plan as an equation where c equals the cost and m equals the minutes used.

b) Graph each Talk and Text plan to determine when both plans cost the same. Write the solution and explain how the graph results match your algebraic solution.



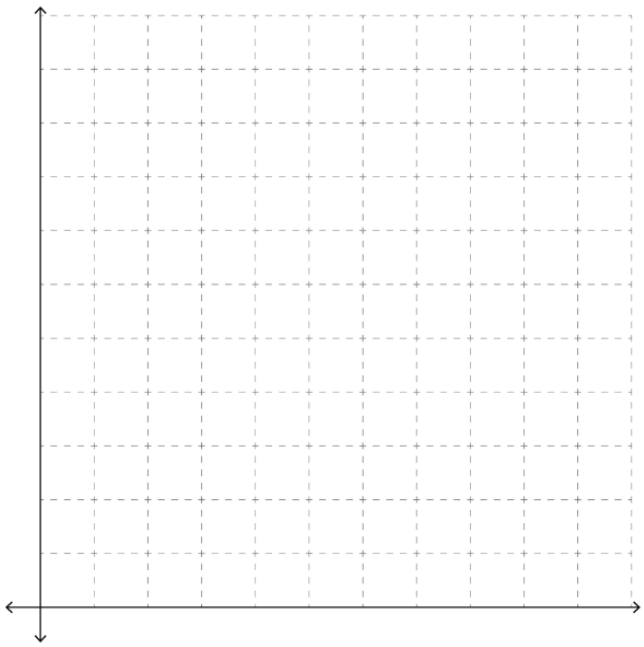
c) If a customer has $75 to spend each month, which plan should the customer choose and why? Use your work to justify your answer.

Rental Plans: Real World Systems by Graphing

At the Wild Thing Zoo, you can rent a motorized cart to tour the grounds for a $4 initial charge and $4 per hour. At Safari Zoo, you can rent the same cart for a $3 initial charge and $5 per hour.

a) Express each rental as an equation where y is the total cost and x represents the total hours.

b) Graph each rent to determine when both cost the same. Write the solution and explain how the graph results match your algebraic solution.



c) Explain when a customer would rent a cart at Wild Thing Zoo and when should a customer rent a cart at Safari Zoo.

Solving Systems using Substitution

Directions: Using substitution, solve each system and match it to the correct answer.

$X - 2y = 0$
$2x - 5y = -4$

(12, 17)

$-1/2\ x - y = -3$
$X + 3y = 6$

(4, 1)

$y = 8 - x$
$4x - 3y = -3$

(2, 3)

$x = 8y$
$x - 4y = 12$

(6, 0)

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

(24, 3)

$-x + 2y = 4$
$5x - 3y = 1$

(2, 1)

$-3x - y = -13$
$x + 2y = 6$

(3, 5)

$4x - y = 7$
$5x - 8y = 2$

(4, 4)

Solving Systems of Equations by Substitution

Candy Bars: Real World Systems by Substitution

Two Snickers bars and one Kit Kat bar contain 70 grams of carbohydrates. One Snickers bar and two Kit Kat bars contain 35 grams of carbohydrates.

a) Write a system of equations to model the situation.

b) Solve the system of equations using the substitution method.

c) Find the carbohydrate content in each candy bar.

Yearbooks: Real World Systems by Substitution

A middle school yearbook committee has 35 members. There are 7 more girls than there are boys.

a) Write a system of equations to model the situation.

b) Solve the system of equations using the substitution method.

c) Identify your solution and explain how it relates to the situation.

Homework: Real World Systems by Substitution

You have 42 math and science problems to complete for homework. You have 10 more math problems than science problems.

a) Write a system of equations to model the situation.

b) Solve the system of equations using the substitution method.

c) Identify your solution and explain how it relates to the situation.

Model Airplane Club: Real World Systems by Substitution

Suppose a model airplane club publishes a newsletter. Expenses are $.90 for printing and mailing each copy, plus $600 total for research and writing. The price of the newsletter is $1.50 per copy.

a) Write a system of equations to model the situation.

b) Solve the system of equations using the substitution method.

c) How many copies of the newsletter must the club sell to break even?

Finding an Unknown Number: Real World Systems by Substitution

Three times one number minus a second is 8, and the sum of the numbers is 12.

a) Write a system of equations to model the situation.

b) Solve the system of equations using the substitution method.

c) What are the two numbers?

Leasing: Real World Systems by Substitution

Maddison is finally moving out of her parents' house! She is looking at two apartments. The lease on apartment 1 has a down payment of $500 and a monthly payment of $726. The lease on apartment 2 has a down payment of $1600 and a monthly payment of $526.

a) Write a system of equations to model the situation.

b) Solve the system of equations using the substitution method.

c) If Maddison keeps the lease for 24 months, which lease should she choose? Explain.

SYSTEMS BY ELIMINATION

Solve each system by elimination.

1) $-4x - 2y = -12$
$4x + 8y = -24$

2) $4x + 8y = 20$
$-4x + 2y = -30$

3) $x - y = 11$
$2x + y = 19$

4) $-6x + 5y = 1$
$6x + 4y = -10$

5) $-2x - 9y = -25$
$-4x - 9y = -23$

6) $8x + y = -16$
$-3x + y = -5$

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

8) $7x + 2y = 24$
$8x + 2y = 30$

9) $5x + y = 9$
$10x - 7y = -18$

10) $-4x + 9y = 9$
$x - 3y = -6$

11) $-3x + 7y = -16$
$-9x + 5y = 16$

12) $-7x + y = -19$
$-2x + 3y = -19$

13) $16x - 10y = 10$
$-8x - 6y = 6$

14) $8x + 14y = 4$
$-6x - 7y = -10$

15) $-4x - 15y = -17$
$-x + 5y = -13$

16) $-x - 7y = 14$
$-4x - 14y = 28$

17) $-7x - 8y = 9$
$-4x + 9y = -22$

18) $5x + 4y = -30$
$3x - 9y = -18$

19) $-4x - 2y = 14$
$-10x + 7y = -25$

20) $3x - 2y = 2$
$5x - 5y = 10$

21) $5x + 4y = -14$
$3x + 6y = 6$

22) $2x + 8y = 6$
$-5x - 20y = -15$

23) $-14 = -20y - 7x$
$10y + 4 = 2x$

24) $3 + 2x - y = 0$
$-3 - 7y = 10x$

Solving Systems of Equations by Elimination

Tickets: Real World Systems by Elimination

Two 8th grade classes are attending an amusement park as a field trip. The teachers purchase tickets for the class and the parent chaperones. Mr. McMatherson purchased 16 child tickets and 4 adult tickets which cost a total of $380. Miss Parabola purchased 5 child tickets and 13 adult tickets which cost a total of $389.

a) Write a system of equations to model the situation.

b) Solve the system of equations using the elimination method.

c) What is the price of 1 adult ticket? What is the price of 1 child ticket?

Knitting: Real World Systems by Elimination

Tammy Tangent is working hard to knit scarves and hats for a craft fair next weekend. Yesterday she completed 3 scarves and 1 hat using a total of 14 meters of yarn. The day before she used 16 meters of yarn to knit 3 scarves and 2 hats. Assume that Tammy is using the same pattern and type of yarn for each scarf and hat.

a) Write a system of equations to model the situation.

b) Solve the system of equations using the elimination method.

c) How much yarn does each item use?

Stats Project: Real World Systems by Elimination

For a project in statistics class, a pair of students decided to invest in two companies, one that produces software and one that does biotechnology research. Jessi purchased 93 shares in the software company and 69 shares in the biotech firm, which cost a total of $9,750. At the same time Jonathan invested a total of $1,766 in 1 share in the software company and 21 shares in the biotech firm.

a) Write a system of equations to model the situation.

b) Solve the system of equations using the elimination method.

c) How much did each company's share cost?

POSSIBLE SOLUTIONS

Directions: Categorize the equations into the appropriate column - show your work. Provide a reason why you have placed each equation in that particular column.

One Solution	No Solution	Infinitely Many Solutions

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

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

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

4.) $y = -2x + 7$
$3y = -6x + 21$

5.) $y = 4x + 3$
$y = 4x + 8$

6.) $y = \frac{1}{2}x - 3$
$y = 0.5x + 2$

7.) $y = 5$
$y = -1$

8.) $y = \frac{1}{5}x + 9$
$5y = x + 45$

9.) $y = \frac{3}{5}x$
$y = \frac{6}{10}x$

10.) Write **three** systems of your own: a system with one solution, a system with no solution, and a system with infinitely many solutions.

Problem of the Week: Systems of Turkeys

Farmer Lewis and Farmer Nate grow turkeys. They gradually pluck the feathers of their prized turkeys so the turkeys do not revolt and run away before Thanksgiving dinner. Farmer Lewis' turkey starts with 40 feathers and he plucks 3 feathers per day. Farmer Nate's turkey starts with 30 feathers and he plucks 2 feathers per day. The turkey's caught onto their plan and decided to run away on the day that they have the same amount of feathers. What day will the turkeys run away and how many feathers will they have left?

Please answer the following for your problem. Some of these items may require looking up unknown information.

1) **Restate the problem(s) in your own words**

_____

_____

2) **What mathematical concepts are involved in this problem? (listed using bullet points)**

3) **Plan of Action**

4) Solution/Work (Label all parts of your work)

WORK:

5) Explanation

WHAT:

WHY: