

MYP UNIT PLANNER: Mathematics

Teacher (s)	Kathleen Racek, Pam Todd, Dave Larsen, Andrea Allen, Carrie Goldin, Rose Marie Jones	Subject Group & Discipline Algebra 1	
Unit Title	Systems of Equations	MYP Year: 4	Unit Duration (days) 6 days including test

STAGE 1 – ESTABLISHING THE PURPOSE OF THE UNIT

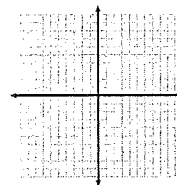
<p>Key Concept: <u>Global Interactions</u></p> <ul style="list-style-type: none">Choose one of 16Represent understandings that reach beyond the subject groups from which they are drawn <table><tr><td>Aesthetics</td><td>Change</td><td>Communication</td><td>Communities</td></tr><tr><td>Connections</td><td>Creativity</td><td>Culture</td><td>Development</td></tr><tr><td>Form</td><td>Global Interactions</td><td>identity</td><td>Logic</td></tr><tr><td>Perspective</td><td>Relationships</td><td>Time/Place/Space</td><td>System</td></tr></table>	Aesthetics	Change	Communication	Communities	Connections	Creativity	Culture	Development	Form	Global Interactions	identity	Logic	Perspective	Relationships	Time/Place/Space	System	<p>Related Concept: <u>Representations and Models</u></p> <ul style="list-style-type: none">Choose one or twoContent specific <table><tr><td>Change</td><td>Equivalence</td><td>Generalization</td></tr><tr><td>Justification</td><td>Measurement</td><td>Model</td></tr><tr><td>Pattern</td><td>Quantity</td><td>Representation</td></tr><tr><td>Simplification</td><td>Space</td><td>System</td></tr></table>	Change	Equivalence	Generalization	Justification	Measurement	Model	Pattern	Quantity	Representation	Simplification	Space	System	<p>Global Context: <u>Identities and relationships</u></p> <ul style="list-style-type: none">Choose one.provide shared starting points for inquiry into what it means to be internationally-minded<ul style="list-style-type: none">Identities and relationshipsOrientation in space and timePersonal and cultural expressionScientific and technical innovationGlobalization and sustainabilityFairness and development
Aesthetics	Change	Communication	Communities																											
Connections	Creativity	Culture	Development																											
Form	Global Interactions	identity	Logic																											
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Simplification	Space	System																												
<p>Statement of Inquiry: <u>How do we find an equilibrium between two functions</u></p>																														

<ul style="list-style-type: none">• Focuses the purpose of the unit.• Merge key and at least two related concepts in one sentence, and ensure that it is related to the global context• Key concept + verb + related concept(s)
Inquiry Questions <ul style="list-style-type: none">• <i>The three inquiry questions should directly lead back to global context</i>
Factual Question: may start with the “what” and can be looked up: big question, should be abstract What is a system of equations? Conceptual Question: may start with “how/why” and should not lead students to a specific answer (open-ended) How do we find the equilibrium point of two functions? Debatable Question: should provocative where further investigation is encouraged Why is this important?

Chapter 6 Systems of Linear Equations

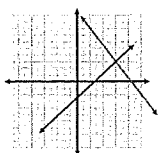
System of linear equations: two or more linear equations put together on the same graph

Solution of linear equations:
Any ordered pair that makes the solution true (where the lines cross)



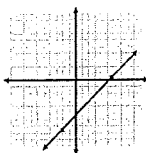
Three types of Systems:

Consistent Independent



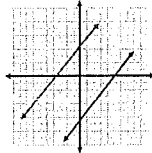
One Solution

Consistent Dependent



Infinitely many solutions

Inconsistent

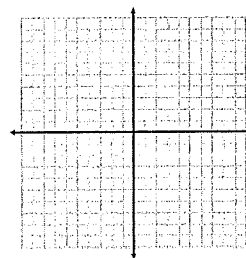


no solution

Solving Systems by Graphing

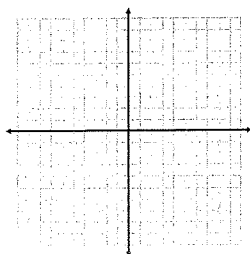
$$y = 2x + 2$$

$$y = -3x + 1$$



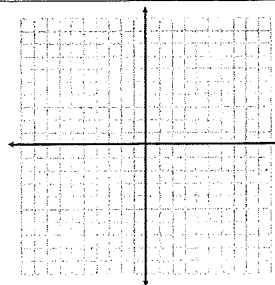
$$4x - y = 8$$

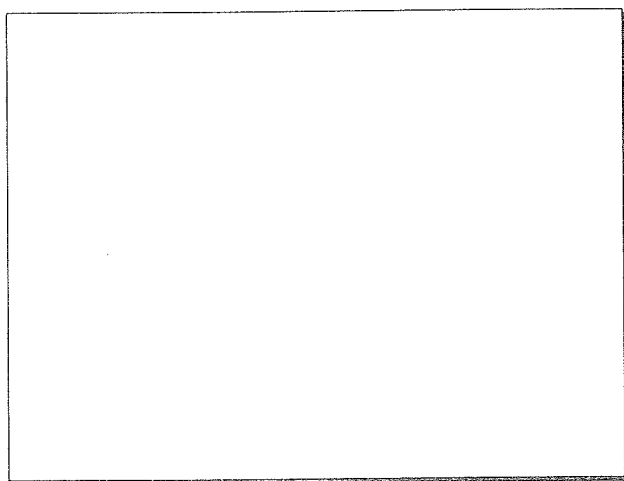
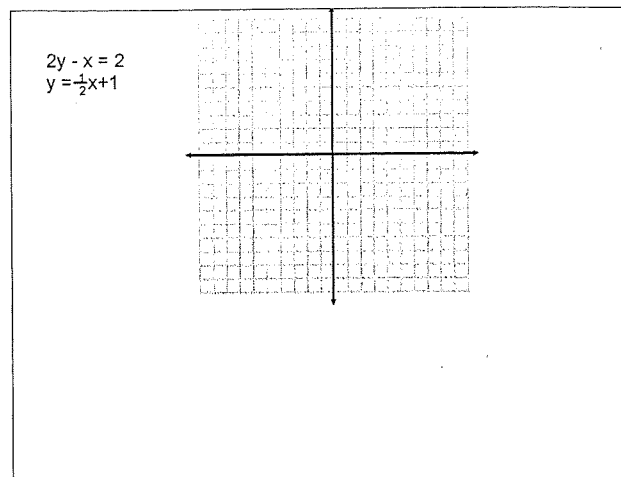
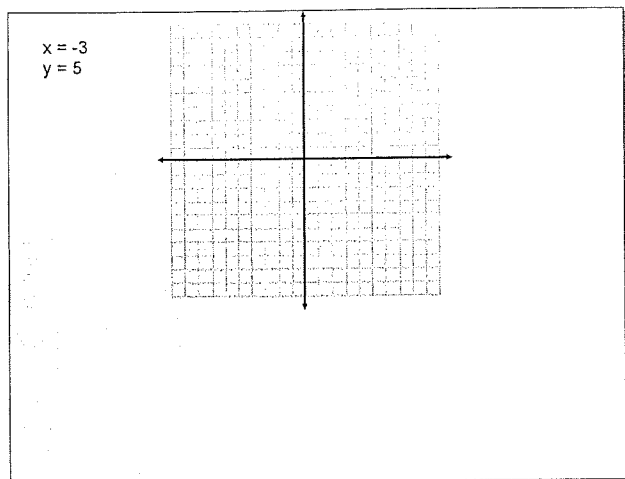
$$y = x - 4$$



$$y = x + 1$$

$$y = x - 2$$





6.2 Solving by Substitution

There are 3 ways to solve a system of linear equations

1.)

2.)

3.)

Review:

If $x = 3$, find $2x - 1$

$$y = 4$$

$$5y + 2$$

Solving LINEAR equations by substitution

$$y = 3x$$

$$x + y = -32$$

Steps:

- 1.) Solve for one of the variables
- 2.) substitute expression into other equation
- 3.) Solve equation
- 4.) plug answer back in to solve for other variable

$$2x + 2y = 38$$

$$y = x + 3$$

$$3y + 4x = 14$$
$$-2x + y = -3$$

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

$$x = -7y + 34$$
$$x + 7y = 32$$

$$-4x + y = 6$$
$$-5x - y = 21$$

6.3 Solving systems by Elimination

Steps for Solving by elimination:

- 1.) set both equations into standard form ($Ax + By = C$)
- 2.) Look at coefficients for all the variables.
- 3.) Identify the coefficients that are OPPOSITE one another
 - If opposites are there, add equations together
 - If opposite are not there multiply equations by a number to make them opposite of each other
- 4.) Solve equation
- 5.) Plug back in to one of the originals to find other variable.

$$\begin{aligned}2x + 5y &= 17 \\ 2x - 5y &= -9\end{aligned}$$

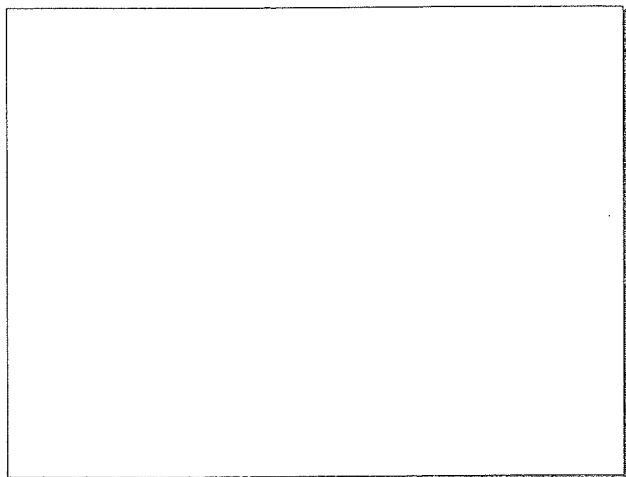
$$\begin{aligned}-3x - 3y &= 9 \\ 3x - 4y &= 5\end{aligned}$$

$$\begin{aligned}-2x + 15y &= -32 \\ 7x - 5y &= 17\end{aligned}$$

$$\begin{aligned}2x + 6y &= 18 \\ x + 3y &= 9\end{aligned}$$

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

$$\begin{aligned}5x - 3y &= 10 \\10x + 6y &= 20\end{aligned}$$



6.4 Applications of Systems of Equations

Solving Word problems

1. Identify what 2 things need found
 - these are your variables
2. What are the 2 equations
 - each sentence is usually an equation
3. Solve the system
 - Substitution
 - elimination
4. Answer the question

Find the value of two numbers if their sum is 12 and their difference is 4.

Flying to Kampala with a tailwind a plane averaged 158 km/h. On the return trip the plane only averaged 112 km/h while flying back into the same wind. Find the speed of the wind and the speed of the plane in still air.

The school that Stefan goes to is selling tickets to a choral performance. On the first day of ticket sales the school sold 3 senior citizen tickets and 1 child ticket for a total of \$38. The school took in \$52 on the second day by selling 3 senior citizen tickets and 2 child tickets. Find the price of a senior citizen ticket and the price of a child ticket.

A boat traveled 210 miles downstream and back. The trip downstream took 10 hours. The trip back took 70 hours. What is the speed of the boat in still water? What is the speed of the current?

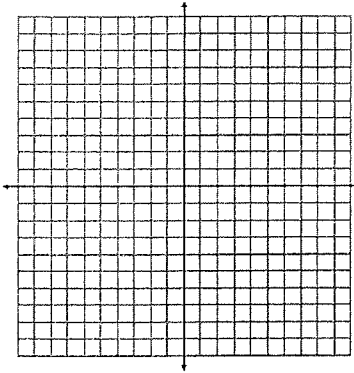
The state fair is a popular field trip destination. This year the senior class at High School A and the senior class at High School B both planned trips there. The senior class at High School A rented and filled 8 vans and 8 buses with 240 students. High School B rented and filled 4 vans and 1 bus with 54 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.

Chapter 6 Test

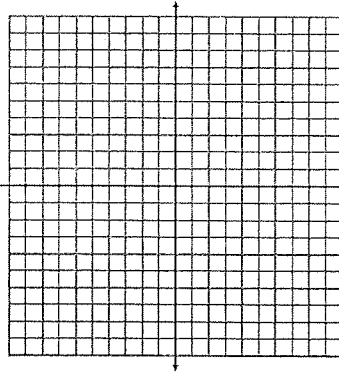
Form G

Solve each system by graphing. Tell whether the system has *one solution*, *infinitely many solutions*, or *no solution*.

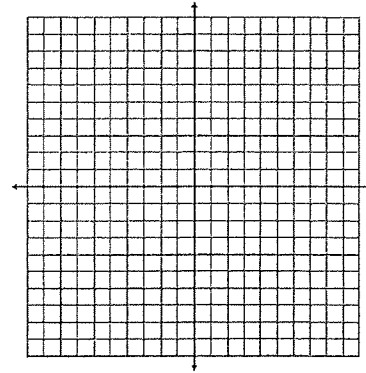
1. $x - 2y = 6$
 $y = -2x + 6$



2. $x + y = 3$
 $3x - 2y = 4$



3. $2x = -4y + 10$
 $6y = -3x + 12$



Solve each system using substitution. Tell whether the system has *one solution*, *infinitely many solutions*, or *no solution*.

4. $3x - 5y = -1$
 $x - y = -1$

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

6. $2x + 3y = 9$
 $3x + 4y = 5$

Solve each system using elimination. Tell whether the system has *one solution*, *infinitely many solutions*, or *no solution*.

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

8. $-2x + 3y = 9$
 $2x - 2y = -4$

9. $x + y = 7$
 $3x - 2y = 11$

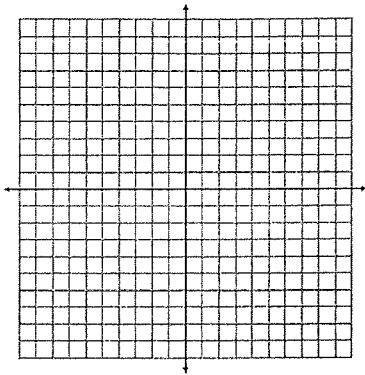
10. The state fair is a popular field trip destination. This year the senior class at High School A and the senior class at High School B both planned trips there. The senior class at High School A rented and filled 8 vans and 8 buses with 240 students. High School B rented and filled 4 vans and 1 bus with 54 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.
11. Five years ago, Betty was twice as old as Tommy. Today, they are 7 years apart. How old are Tommy and Betty?
12. A change purse contains a total of 100 nickels and dimes. The total value of the coins is \$7. How many coins of each type does the purse contain?

Chapter 6 Chapter Test (continued)

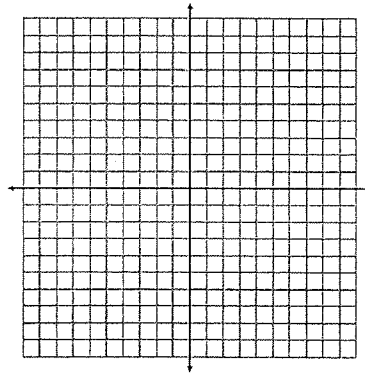
Form G

Graph each inequality in the coordinate plane.

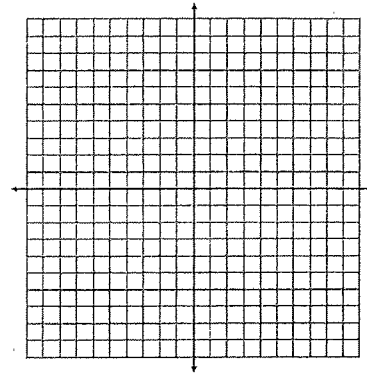
13. $2x + 3y \leq 12$



14. $2x - y \geq 1$

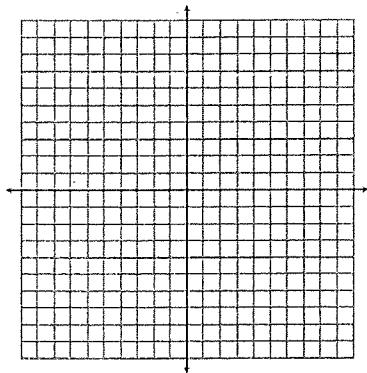


15. $-3x + 2y < 6$

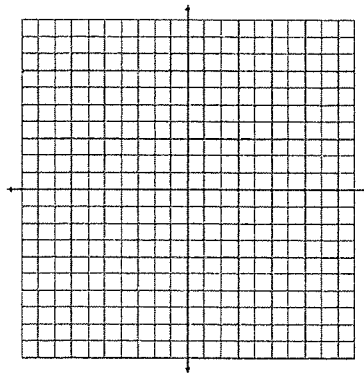


Solve each system of inequalities by graphing.

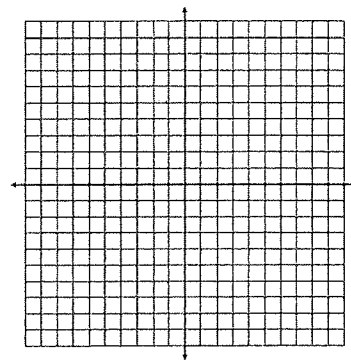
16. $2x + 3y \leq 6$
 $3x + 2y \leq 6$



17. $x + y \geq 9$
 $3x + y \geq 12$



18. $5x + y > 10$
 $2x + y < 15$



19. For a party, you can spend no more than \$20 on cupcakes. Vanilla cupcakes cost \$4 and red velvet cupcakes cost \$2. Write the linear inequality that models the situation. Graph the inequality.

20. **Error Analysis** A student determined that (1, 1) is one of the solutions of the linear inequality $y \leq 2x - 3$, as shown below. What error did the student make?

$$y \leq 2x - 3$$

$$1 \leq 2(1) - 3$$

$$1 \leq 1$$

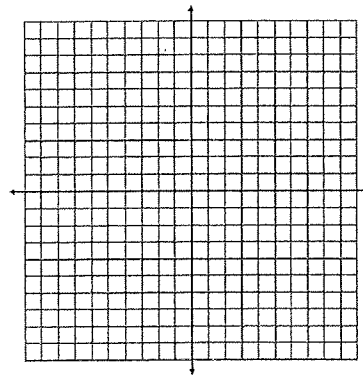
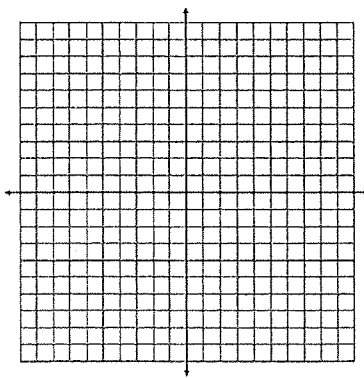
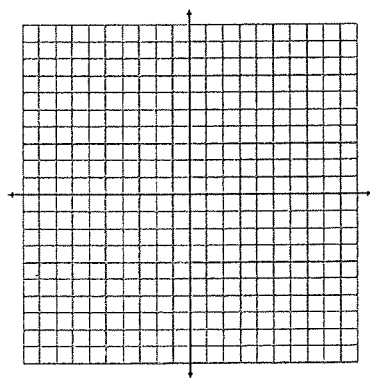
Review Problems

21. Graph

$$3y = -21$$

$$5x = 20$$

$$y = -2x + 1$$



22. Write the following in SLOPE INTERCEPT FORM

$$m = \frac{-1}{3}, b = 5$$

$$m = \frac{2}{5}, (-10, 8)$$

$$3x - 2y = 18$$

23. Find the equation to represent the Perimeter of the following rectangle if the Perimeter equals 24 cm.

