**Standards: A2.A.REI.C.4** (formerly A.REI.C.6) Write and solve a system of linear equations in context. **A2.A.REI.D.6** (formerly A.REI.11) Explain why the x-coordinates of the points where the graphs of the equations y = f(x) and y = g(x) intersect are the solutions of the equation f(x) = g(x); find the approximate solutions using technology. ★ Include cases where f(x) and/or g(x) are **linear**, polynomial, rational, absolute value, exponential, and logarithmic functions.

**Objectives:** Students will solve linear systems of equations using tables and graphs, both by hand and calculator

**3-1 Solving Systems Using Tables and Graphs**

**Warm up Graph/sketch the linear function from standard form (use x and y intercept points)**

**-3x + 4y= 12**

**COPY THE Key Concepts**

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_- a set of two or more equations that use the same variables.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_- when the graph of each equation of a system is a line.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ – a set of values for the variables that makes all the equations true.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_- a system that has a unique (one) solution. (Intersecting lines, different slopes)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_- a system that have infinitely many solutions (Coinciding lines, same ***m*** and same ***b*)**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_-** a system with no solution (Parallel lines, same ***m*** but different ***b***)

 **One solution Infinitely many solutions No solution**

 **Consistent Consistent Inconsistent**

 **Independent Dependent**

1. Classify the system without graphing. $\left\{\begin{array}{c}4y-2x=6\\8y=4x-12\end{array}\right.$ 2.Classify the system without graphing. $\left\{\begin{array}{c}y=3x+2\\-6x+2y=4\end{array}\right.$
2. Solve each system by graphing and by using a table of values
3. $\left\{\begin{array}{c}y=x\\y=2x+2\end{array}\right.$ b. $ \left\{\begin{array}{c}-3x+2y=8\\x+4y=-12\end{array}\right.$
4. You bought a total of 6 pens and pencils for $4. If each pen costs $1 and each pencil costs $.50, how many pens and pencils did you buy? Write a system of equations and solve by graphing.

**Group Practice**

**Solve each system by graphing.**

1. $\left\{\begin{array}{c}y=x-2\\y=-2x+7\end{array}\right.$ **2.** $\left\{\begin{array}{c}2x+4y=12\\x+y=2\end{array}\right.$

**Write and solve a system of equations by graphing (calculator)**

1. A store sells small notebooks for $8 and large notebooks for $10. If you buy 6 notebooks and spend $56, how many of each notebook did you buy?
2. A shop has one-pound bags of peanuts for $2 and three-pound bags of peanuts for $5.50. If you buy 5 bags and spend $17, how many of each size bag did you buy?

**Mini white board activity:** PAGE 61 IN THE WORKBOOKS PROBLEMS 1-4, **EXTRA CREDIT #5.**

**Exit ticket (use the paper slips in your baskets):** Solve a system by graphing y = -3x+ 1 and y= -x -1

**Standards: A2.A.REI.C.4** (formerly A.REI.C.6) Write and solve a system of linear equations in context. **A2.A.REI.D.6** (formerly A.REI.11) Explain why the x-coordinates of the points where the graphs of the equations y = f(x) and y = g(x) intersect are the solutions of the equation f(x) = g(x); find the approximate solutions using technology. ★ Include cases where f(x) and/or g(x) are **linear**, polynomial, rational, absolute value, exponential, and logarithmic functions.

**Objectives:** Students will solve linear systems of equations using substitution and elimination

**3-2 Solving Systems Algebraically**

**Part 1: Substitution Method**

**Warm up- Solve the following functions for y**

1. **-3x -y = 5 -4x +2/3 y = 8**

**Key Concepts**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**– means to plug in or replace a variable with an expression.

**Steps for Solving Systems using Substitution:**

1. Solve one of the functions for x or y, whichever one more convenient

2. Substitute the expression for that function for x or y (whichever one you solved for) in the second function

3. Simplify and solve for the variable

4. Plug in the first answer to one of the original functions to solve for the other variable

**Examples**

1. Solve the system by substitution.$ \left\{\begin{array}{c}y=x\\y=-x+2\end{array}\right.$

1. Solve the system by substitution.$ \left\{\begin{array}{c}x+3y=5\\-2x+4y=0\end{array}\right.$
2. Solve the system by substitution.$ \left\{\begin{array}{c}r+s=-12\\4r-6s=12\end{array}\right.$

**Part 2: Elimination Method**

**Key Concepts**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_-** using additive inverses (opposite numbers) and the Addition Property of Equality to cancel a variable.

**Steps for Solving Systems using Elimination:**

1. Align the corresponding terms above one another (if needed)

2. Multiply one or both equations by a number that will create opposite coefficients with at least one variable (if needed)

3. Add the equations together (cancel the opposite terms and add the resulting terms)

4. Solve for the remaining variable

5. Substitute the value to one of the original values to find the answer to the second variable.

4.Solve the system by elimination.$ \left\{\begin{array}{c}3x+y=-9\\-3x-2y=12\end{array}\right. 5. $Solve the system by elimination.$ \left\{\begin{array}{c}3x+5y=13\\2x+y=4\end{array}\right.$

6. Solve the system by elimination.$ \left\{\begin{array}{c}2x+4y=-4\\3x+5y=-3\end{array}\right.$ 7. Solve the system by elimination.$ $ $\left\{\begin{array}{c}-6=3x-6y\\4x=4+5y\end{array}\right.$

Systems without unique solutions. Solve both problems by substitution and elimination.

 8. $\left\{\begin{array}{c}-3x+y=-5\\3x-y=5\end{array}\right.$ 9. $\left\{\begin{array}{c}4x-6y=6\\-4x+6y=10\end{array}\right.$

**Mini white board activity:** PAGE 65 IN THE WORKBOOKS PROBLEMS 1-4, **EXTRA CREDIT #5.**

**Exit ticket (use the paper slips in your baskets):** Solve the system using a method of your choice

-x +y = 10 and 3y= 6x+18

**Standards: A2.A.REI.C.4** (formerly A.REI.C.6) Write and solve a system of linear equations in context. **A2.A.REI.D.6** (formerly A.REI.11) Explain why the x-coordinates of the points where the graphs of the equations y = f(x) and y = g(x) intersect are the solutions of the equation f(x) = g(x); find the approximate solutions using technology. ★ Include cases where f(x) and/or g(x) are **linear**, polynomial, rational, absolute value, exponential, and logarithmic functions.

**Objectives:** Students will solve linear systems of inequalities by graphing.

**3-3 Solving Systems of Inequalities**

**Key Concepts**

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_- a set of two or more inequalities that use the same variables.

**Steps to Solving Systems of Inequalities by Graphing:**

1. Solve both inequalities for y 2. Graph both inequalities (use dashed line for < or >, or full line for ≤ or ≥ )

3. Determine at which region two inequalities overlap and shade that area of the graph

**Examples**

1. Solve the system. $\left\{\begin{array}{c}y\geq 3\\y>2x+1\end{array}\right.$ Solve the system. $\left\{\begin{array}{c}-x+y<-1\\x+y<3\end{array}\right.$

**THINK question: Can a system of two inequalities have no solutions? Explain.**

**3.** The dry cleaner charges $4 to clean a pair of pants and $3 to clean a shirt. You want to get at least 8 items cleaned. You have $32 to spend on dry cleaning.

Write a system of inequalities to model the situation and solve the system by graphing.

**Mini white board activity:** PAGE 69 IN THE WORKBOOKS PROBLEMS 1-4, **EXTRA CREDIT #5.**

**Exit ticket (use the paper slips in your baskets):** solve the system of inequalities by graphing ****

**Standards: A2.A.REI.C.4** (formerly A.REI.C.6) Write and solve a system of linear equations in context. **A2.A.REI.D.6** (formerly A.REI.11) Explain why the x-coordinates of the points where the graphs of the equations y = f(x) and y = g(x) intersect are the solutions of the equation f(x) = g(x); find the approximate solutions using technology. ★ Include cases where f(x) and/or g(x) are **linear**, polynomial, rational, absolute value, exponential, and logarithmic functions.

**Objectives:** Students will solve linear systems of equations using matrices.

**3-6 Solving Systems Using Matrices**

**Warm up Solve the system of equations using any method learned in previous lessons**

 **(graphing, substitution, elimination)**

**-x + y = 5**

**7 = 2y -5x**

**Key Concepts**

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_- a rectangular array of numbers ; \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_- each number in a matrix

**Examples**

1. Consider the matrix A = $\left[\begin{array}{c}4 9 17 1\\0 5 8 6\\3 2 10 0\end{array}\right]$. How many rows does matrix A have? How many columns does matrix A have? How many elements does matrix A have? What is the dimension of matrix A? Identify elements$ a\_{23 }and a\_{14}$.
2. Write the system as a matrix then solve it.
3. $\left\{\begin{array}{c}-4x-2y=7\\3x+y=-5\end{array}\right.$ b. $\left\{\begin{array}{c}x-3y+z=6\\x+3z=12\\y=-5x+1\end{array}\right.$

One solution answer example: No solution answer example: Infinitely many solutions answer example:

**Group work** Solve the system using a matrix.

a) $\left\{\begin{array}{c}3x+4y=12\\2x+y=10\end{array}\right.$ b.$ \left\{\begin{array}{c}2x-y+z=4\\x+3y-z=11\\4x+y-z=14\end{array}\right. c)$ $\left\{\begin{array}{c}2x+3y-2z=-1\\x+5y=9\\4z-5x=4\end{array}\right.$

**Mini white board activity:** PAGE 81 IN THE WORKBOOKS PROBLEMS 1-3, **EXTRA CREDIT #4.**

**Exit ticket (use the paper slips in your baskets):** Solve the system using a matrix ****

**Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Period \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**CHAPTER 3 HOMEWORK**

**Attach this sheet on top of additional pages submitted.**

**Practice 3-1: Complete your assignment on a separate sheet of GRAPH PAPER and Show all work!**

**Solve each system by graphing or using a table. Check your answers.**

**1. 2. ** **3.  4. **

**5.  6.  7. 8. **

**9. ** **10**. ** 11.  12. **

**Write and solve a system of equations for each situation. Check your answers.**

**13**. Your school sells tickets for its winter concert. Student tickets are $5 and adult tickets are $10. If your school sells 85 tickets and makes $600, how many of each ticket did they sell?

**14.** A grocery store has small bags of apples for $5 and large bags of apples for $8. If you buy 6 bags and spend $45, how many of each size bag did you buy?

**Practice 3-2: Complete your assignment on a separate sheet of paper. Show all work!**

**Solve by substitution**

1. $\left\{\begin{array}{c}4x+2y=7\\y=5x\end{array}\right.$ **2.** $\left\{\begin{array}{c}x+12y=68\\x=8y-12\end{array}\right.$ **3.** $\left\{\begin{array}{c}y=2x-1\\3x-y=-1\end{array}\right.$
2. A student has some $1 bills and $5 bills in his wallet. He has a total of 15 bills that are worth $47. How many of each type of bill does he have? Write and solve a system of equations using substitution.
3. A student took 60 minutes to answer a combination of 20 multiple choice and extended response questions. She took 2 minutes to answer each multiple choice question and 6 minutes to answer each extended response question. How many of each type of question was on the test? Write and solve a system of equations using substitution.

**Solve by elimination**

1. $\left\{\begin{array}{c}x+y=12\\x-y=2\end{array}\right.$ **7.** $\left\{\begin{array}{c}4r+2s=4\\6r+2s=8\end{array}\right.$ **8.** $\left\{\begin{array}{c}3x+2y=6\\3x+3=y\end{array} \right. 9. \left\{\begin{array}{c}5a-2b=-19\\2a+3b=0\end{array}\right.$ **10.** $\left\{\begin{array}{c}7x+2y=-8\\4x=8y\end{array}\right.$

**Practice 3-3: Complete your assignment on a separate sheet of GRAPH PAPER. Show all work!**

1. $\left\{\begin{array}{c}y<-2x+4\\y\leq x+2\end{array}\right.$ 2. $\left\{\begin{array}{c}x-y\geq 1\\2x+3y<21\end{array}\right.$ 3. $\left\{\begin{array}{c}-3x+y<3\\x+y>-1\end{array}\right.$

**Practice 3-6: Complete your assignment on a separate sheet of paper. Show all work!**

Write a matrix to represent the system of equations then solve.

**1)**  **2)**  **3) **  **4) **