Name

Date Period

Guided Notes: Operations with Matrices:

For this lesson, you will be teaching your classmates. These guided notes will be your guide to each section in the lesson. You will be divided into groups and given a part of the lesson to learn. There is a website listed for each section to guide you and you may also use your textbooks. After you have your section filled in, I will assign you to another group consisting of one person from each original group. You will then take turns explaining and teaching your part of the lesson. You must provide examples and cover all main points. At the end of the lesson, you will be assessed by a quiz so I can see how much you learned.

**Equality of Matrices:**

<http://www.purplemath.com/modules/matrices3.htm>

Representation of Matrices:

Matrices can be denoted in three ways. They are:

1. .
2. .
3. .

Two matrices are equal if they have the and all of their are equal.

For example, using the matrix equation:

 a b 1 2

 =

 c d 3 4

we can conclude that a=

 b=

 c=

 d=

Find 3 examples that you can use to teach your classmates this topic.

**Matrix Addition and Subtraction:**

<http://stattrek.com/matrix-algebra/matrix-addition.aspx>

If A and B are matrices of the same , then their sum can be found be their corresponding entries.

The sum of matrices of is undefined.

Examples:

1. -1 2 + 1 3

 0 1 -1 2

1. 1 -1

-3 + 3

-2 2

1. 2 1 0 + 0 1

4 0 -1 -1 3

1. 0.5 1.3 -2.6 + -3.2 4.8 9.6

1.1 2.3 3.4 -4.5 3.2 -1.7

Matrix subtraction works exactly like addition! The matrices must have the same . Read the information in the website above and answer the following questions:

1. -1 2 \_ 1 3

 0 1 -1 2

1. 1 -1

-3 \_ 3

-2 2

1. 2 1 0 \_ 0 1

4 0 -1 -1 3

1. 0.5 1.3 -2.6 \_ -3.2 4.8 9.6

1.1 2.3 3.4 -4.5 3.2 -1.7

Find 3 more examples that can help you teach this topic to your classmates.

**Multiplication by a Scalar and Matrix Multiplication:**

<http://coolmath.com/algebra/24-matrices/03-scalar-multiplication-01.htm>

<http://www.mathwarehouse.com/algebra/matrix/multiply-matrix.php>

Scalar Multiplication:

A scalar can be any that you can multiply the matrix by.

To multiply the matrix by a scalar, multiply each of the matrix by the .

Examples:

If A = 2 2 4 and B = 2 0 0 find the following:

 -3 0 -1 1 -4 3

 2 1 2 -1 3 2

1. 3A
2. -2B
3. –A
4. 5B

Matrix Multiplication:

Matrix multiplication is the process of multiplying each by the entry in the corresponding .

For example,

 Matrix A = 3x2 matrix Matrix B = 2x2 matrix

 -1 3 -3 2

 4 2 -4 1

 5 0

The solution to the multiplication of this matrix is a matrix.

The solution is found in this manner:

 (-1)(-3) + (3)(-4) (-1)(2) + (3)(1) \_\_ \_\_

 (4)( ) + (-2)(-4) (4)(2) + ( )(1) = \_\_ \_\_

 (5)( ) + (0)( ) (5)(2) + ( )(1) \_\_ \_\_

Solve the following examples:

1. 1 0 3 -2 4 2

2 -1 -2 x 1 0 0

 -1 1 -1

1. 3 4 1 0

-2 5 x 0 1

1. 1 2 -1 2

1 1 x 1 -1

1. -2 1 -2 3 1 4

 1 3 x 0 1 -1 2

 1 4 2 -1 0 1

Find 3 more examples that you can use to teach this part to your classmates.

**Applications:**

<http://www.mathsisfun.com/algebra/systems-linear-equations-matrices.html>

<http://www.millersville.edu/~bikenaga/basic-algebra/systems-word-problems/systems-word-problems.html>

Matrix multiplication can be used to represent . The form the first matrix, and the variables form the corresponding matrix that, when multiplied give the matrix.

The matrix equation form is .

Consider the system of linear equations: x1 – 2x2 + x3 = -4

 x2 + 2x3 = 4

 2x1 + 3x2 – 2x3 = 2

 Write this system as a matrix equation.

 Solve using Gauss-Jordan elimination.

Create matrices to solve the following problem:

A company offers three types of health care plans with two levels of coverage to its employees. The current annual costs for these plans are represented by the matrix A. If the annual costs are expected to increase by 4% next year, what will be the annual costs for each plan next year?

A = 694 451 489

 1725 1187 1248

Find 3 other examples that you can use to teach your classmates this topic.

**Group 1:** Matrix Equality

**Group 2:** Matrix Addition and Subtraction

**Group 3:** Scalar Multiplication and Matrix Multiplication

**Group 4:** Applications

**Group 5:** Experts Group

**So How Did You Like the Lesson?**

I want your feedback. What did you like about this lesson? What did you dislike? What could I change to make the lesson better? Also tell me about your groups. Did you think that the group setup was helpful and a good way to collaborate with your peers?