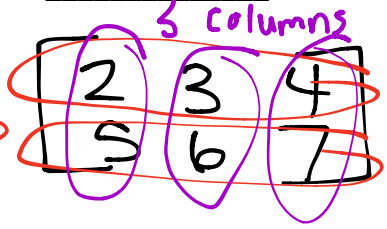
Unit 2: Linear and Absolute Value Functions – 2.15
Algebra II – Ms. Cutrona

Name:_____
Period:_____ Date: 11.1.13

Objective for Friday 11.1: I can add and subtract matrices.
I can multiply matrices by a scalar.

Matrix Basics	
	Matrices look like this $\begin{bmatrix} 1 & 2 & 4 \\ -2 & -3 & 7 \end{bmatrix}$ $\begin{bmatrix} 5 & 0 & 4 & 7 \end{bmatrix}$
Dimensions	They have rows and columns. If you record the dimensions of a matrix, the row come first and the columns come second. Remember: RxC (RC cola) 
Notation	$A = \begin{bmatrix} 2 & 1 \end{bmatrix}$ "matrix A"
Element	element is each # in a matrix
Adding and subtracting	To add and subtract (elements) have same spot 1.) Find the locations that 2.) add or subtract the numbers in those locations using the rules 3.) Your answer should be a matrix of the same dimensions
Scalar	A scalar is a number that you multiply by each number in the matrix.
Multiplying by a scalar	To multiply by a scalar, (element) 1.) Multiply each number in each location by the scalar. 2.) Your answer should be a matrix of the same dimensions
Solve an equation using matrices	Solve for x and y. $\begin{bmatrix} y \\ 3x \end{bmatrix} = \begin{bmatrix} 6 & -2x \\ 31 & +4y \end{bmatrix}$

Examples

Example 1

$A = \begin{bmatrix} 4 & -6 \\ 2 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} -3 & 7 \\ 5 & -9 \end{bmatrix}$

R C
2 × 2

R × C
2 × 2

a. What are the dimensions of A? 2 × 2 of B? 2 × 2

b. Find A + B

$$\begin{bmatrix} 4 & -6 \\ 2 & 3 \end{bmatrix} + \begin{bmatrix} -3 & 7 \\ 5 & -9 \end{bmatrix} = \begin{bmatrix} 1 & 1 \\ 7 & -6 \end{bmatrix}$$

c. Find A – B

$$\begin{bmatrix} 4 & -6 \\ 2 & 3 \end{bmatrix} - \begin{bmatrix} -3 & 7 \\ 5 & -9 \end{bmatrix} = \begin{bmatrix} 7 & -13 \\ -3 & 12 \end{bmatrix}$$

3 − (−9)

d. Find 4A

$$4\begin{bmatrix} 4 & -6 \\ 2 & 3 \end{bmatrix} = \begin{bmatrix} 16 & -24 \\ 8 & 12 \end{bmatrix}$$

e. Find -3B

$$-3\begin{bmatrix} -3 & 7 \\ 5 & -9 \end{bmatrix} = \begin{bmatrix} 9 & -21 \\ -15 & 27 \end{bmatrix}$$

2 × 2

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Matrix Basics

Dimensions

Matrices look like this

$\begin{bmatrix} 2 & 3 & 7 & 9 \end{bmatrix}$ $\begin{bmatrix} 2 & 4 & -3 \\ 2 & 0 & -12 \end{bmatrix}$

They have rows - horizontal and columns - vertical. If you record the dimensions of a matrix, the row come first and the columns come second. Remember: RxC

RC cola

Notation

"matrix A"

$A = \begin{bmatrix} 7 & 4 & -2 \\ -1 & -10 & 3 \end{bmatrix}$

2 rows x 3 columns

2 x 3

Element

each # in matrix

Adding and subtracting

To add and subtract

1.) Find the locations that elements match
2.) Add or subtract the numbers in those locations using the rules
3.) Your answer should be a matrix of the same dimension.

Scalar

A scalar is a number that you multiply by each number (element) in the matrix.

Multiplying by a scalar

To multiply by a scalar

1.) Multiply each number in each location by the scalar
2.) Your answer should be a matrix of the same dimension.

Solve an equation using matrices

Solve for x and y. $\begin{bmatrix} y \\ 3x \end{bmatrix} = \begin{bmatrix} 6 & -2x \\ 31 & +4y \end{bmatrix}$

Examples

Example 1

$A = \begin{bmatrix} 4 & -6 \\ 2 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} -3 & 7 \\ 5 & -9 \end{bmatrix}$

a. What are the dimensions of A? 2x2 of B? 2x2

b. Find A + B

$$\begin{bmatrix} 4 & -6 \\ 2 & 3 \end{bmatrix} + \begin{bmatrix} -3 & 7 \\ 5 & -9 \end{bmatrix} = \begin{bmatrix} 1 & 1 \\ 7 & -6 \end{bmatrix}$$

c. Find A – B

$$\begin{bmatrix} 4 & -6 \\ 2 & 3 \end{bmatrix} - \begin{bmatrix} -3 & 7 \\ 5 & -9 \end{bmatrix} = \begin{bmatrix} 7 & -13 \\ -3 & 12 \end{bmatrix}$$

d. Find 4A

$$4\begin{bmatrix} 4 & -6 \\ 2 & 3 \end{bmatrix} = \begin{bmatrix} 4\times4 = 16 & 4\times-6 = -24 \\ 4\times2 = 8 & 4\times3 = 12 \end{bmatrix}$$

e. Find -3B

$$-3\begin{bmatrix} -3 & 7 \\ 5 & -9 \end{bmatrix} = \begin{bmatrix} 9 & -21 \\ -15 & 27 \end{bmatrix}$$

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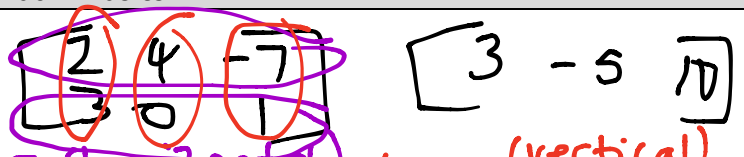
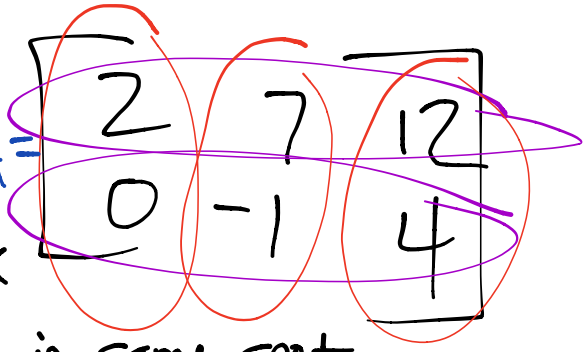
	Matrices look like this 
Dimensions	They have rows (horizontal) and column (vertical). If you record the dimensions of a matrix, the rows come first and the columns come second. Remember: R × C.
Notation	"matrix A" RC 
Element	2 × 3 → each # in matrix
Adding and subtracting	To add and subtract (elements) 1.) Find the locations that are in same spot 2.) Add or subtract the numbers in those locations using the rules 3.) Your answer should be a matrix of the same dimensions.
Scalar	A scalar is a number that you multiply by each number in the matrix.
Multiplying by a scalar	To multiply by a scalar, (elements) 1.) Multiply each number in each location by the scalar 2.) Your answer should be a matrix of the same dimensions
Solve an equation using matrices	Solve for x and y. $\begin{bmatrix} y \\ 3x \end{bmatrix} = \begin{bmatrix} 6 & -2x \\ 31 & +4y \end{bmatrix}$

Examples

Example 1

$A = \begin{bmatrix} 4 & -6 \\ 2 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} -3 & 7 \\ 5 & -9 \end{bmatrix}$

a. What are the dimensions of A? 2×2 of B? 2×2

b. Find A + B

$$\begin{bmatrix} 4 & -6 \\ 2 & 3 \end{bmatrix} + \begin{bmatrix} -3 & 7 \\ 5 & -9 \end{bmatrix} = \begin{bmatrix} 1 & 1 \\ 7 & -6 \end{bmatrix}$$

c. Find A – B

$$\begin{bmatrix} 4 & -6 \\ 2 & 3 \end{bmatrix} - \begin{bmatrix} -3 & 7 \\ 5 & -9 \end{bmatrix} = \begin{bmatrix} 7 & -13 \\ -3 & 12 \end{bmatrix}$$

4 − (−3) → 7; −6 − 7 → −13; 2 − 5 → −3; 3 − (−9) → 12

d. Find 4A (4 scalar)

$$4\begin{bmatrix} 4 & -6 \\ 2 & 3 \end{bmatrix} = \begin{bmatrix} 16 & -24 \\ 8 & 12 \end{bmatrix}$$

e. Find -3B

$$-3\begin{bmatrix} -3 & 7 \\ 5 & -9 \end{bmatrix} = \begin{bmatrix} 9 & -21 \\ -15 & 27 \end{bmatrix}$$

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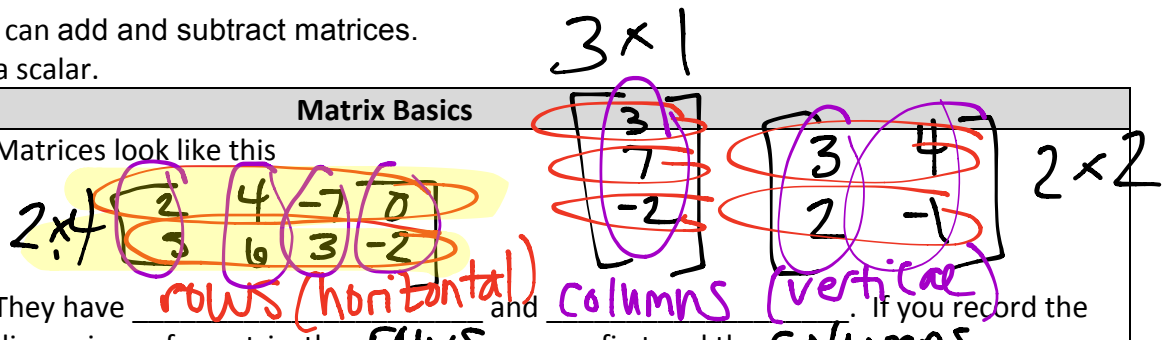

They have _____ and _____. If you record the dimensions of a matrix, the _____ come first and the _____ come second. Remember: _____

Notation

"matrix A"

$$A = \begin{bmatrix} 5 & 7 \\ -3 & 0 \end{bmatrix}$$

Element

"5 is an element. Row 1, column 1"

↳ each # in matrix

Adding and subtracting

To add and subtract, (elements) _____ (same row, same column)

1.) Find the locations that _____
2.) _____ or _____ the numbers in those locations using the rules
3.) Your answer should be a matrix of the _____ _____

Scalar

A scalar is a _____ that you multiply by each number in the matrix.

Multiplying by a scalar

To multiply by a scalar,

1.) Multiply each number in each location by the _____
2.) Your answer should be a matrix of the _____ _____

Solve an equation using matrices

Solve for x and y. $\begin{bmatrix} y \\ 3x \end{bmatrix} = \begin{bmatrix} 6 & -2x \\ 31 & +4y \end{bmatrix}$

Examples

Example 1

$A = \begin{bmatrix} 4 & -6 \\ 2 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} -3 & 7 \\ 5 & -9 \end{bmatrix}$

a. What are the dimensions of A? 2×2 of B? 2×2

b. Find A + B

A B

$\begin{bmatrix} 4 & -6 \\ 2 & 3 \end{bmatrix} + \begin{bmatrix} -3 & 7 \\ 5 & -9 \end{bmatrix} = \begin{bmatrix} 1 & 1 \\ 7 & -6 \end{bmatrix}$

c. Find A – B

$\begin{bmatrix} 4 & -6 \\ 2 & 3 \end{bmatrix} - \begin{bmatrix} -3 & 7 \\ 5 & -9 \end{bmatrix} = \begin{bmatrix} 7 & -13 \\ -3 & 12 \end{bmatrix}$

$4-(-3)=7$

$-6-7=-13$

$2-5=-3$

$3-(-9)=12$

d. Find 4A

0 → scalar

$4 \begin{bmatrix} 4 & -6 \\ 2 & 3 \end{bmatrix} = \begin{bmatrix} 16 & -24 \\ 8 & 12 \end{bmatrix}$

4×4 4×-6 4×2 4×3

e. Find -3B

$-3 \begin{bmatrix} -3 & 7 \\ 5 & -9 \end{bmatrix} = \begin{bmatrix} 9 & -21 \\ -15 & 27 \end{bmatrix}$