GUIDED NOTES – 7.5 MATRICES AND MATRIX OPERATIONS

LEARNING OBJECTIVES

In this section, you will:

- Find the sum and difference of two matrices.
- Find scalar multiples of a matrix.
- Find the product of two matrices.

FINDING THE SUM AND DIFFERENCE OF TWO MATRICES

- A matrix is a rectangular array of numbers often referred to by its size or dimensions: $m \times n$ where m represent the number of _____ and n represent the number of _____. A matrix is usually named by a capital letter.

$$K = \begin{bmatrix} 2 & 3 \\ 7 & 9 \\ 5 & 0 \end{bmatrix}$$

How many rows m and how many columns n does matrix K have?

- Addition and subtraction is only possible when the matrices have the _____ dimensions.

Try It: Read Examples 3, 4, and 5 in the text, then answer the following.

Add matrix A and matrix B.

$$A = \begin{bmatrix} 2 & 6 \\ 1 & 0 \\ 1 & -3 \end{bmatrix} \text{ and } B = \begin{bmatrix} 3 & -2 \\ 1 & 5 \\ -4 & 3 \end{bmatrix}$$

Homework: *You should now be ready to attempt problems 1-3 in "Homework – Section 7.5" on WeBWorK.*

FINDING SCALAR MULTIPLES OF A MATRIX

- In many cases we need to multiply a matrix by a constant called a _____. A scalar multiple is any entry that results from_____.

Try It: Read Example 6 in the text, then answer the following.

Given matrix B, find $-2B$ where

$$B = \begin{bmatrix} 4 & 1 \\ 3 & 2 \end{bmatrix}$$

Homework: *You should now be ready to attempt problems 4-5 in "Homework – Section 7.5" on WeBWorK.*

FINDING THE PRODUCT OF TWO MATRICES

- Finding the product of two matrices is only possible when the inner dimensions are the _____. This means that the number of columns of the first matrix is equal to the number of _____ of the second matrix

$$\begin{array}{ccc} A & \cdot & B \\ 2 \times \underbrace{3}_{\text{same}} & & \underbrace{3} \times 3 \end{array}$$

Try It: Read Examples 8 and 9 in the text, then answer the following.

Given A and B, explain why the product AB is defined, but the product BA is *not*.

$$A = \begin{bmatrix} 2 & 6 \\ 1 & 0 \\ 1 & -3 \end{bmatrix} \text{ and } B = \begin{bmatrix} 5 & -8 \\ 2 & 1 \end{bmatrix}$$