**Chapter 4 Matrices Algebra 2CP Period 2, 3, 6**

 **June 5, 2015**

**A matrix is a rectangular array of variables or constants in horizontal rows and vertical columns, usually enclosed in brackets.**

**Dimensions of a matrix with *m* rows and *n* columns is an \_\_\_\_\_\_\_\_\_\_\_\_\_matrix. (read as “*m* by *n*”)**

**Example Matrix A is a 4 X 3 matrix since it has**

**4 rows and 3 columns.**

**The element 10 is in row 4, column 2.**

**Row matrix – a matrix with only one row.**

**Column matrix – a matrix with only one column.**

**Square matrix – a matrix with the same number of rows and columns.**

**Zero matrix – a matrix in which every element is 0.**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**4.2 Operations with matrices p 169**

**Matrices can be added if and only if they have the same dimensions.**

**Scalar Multiplication**

**You can multiply any matrix by a constant called a scalar. This operation is called scalar multiplication.**

**Examples.**

**Properties of Matrix Operations**

**For any matrices A, B, and C with the same dimensions and any scalar c, the following are true:**

 **Commutative Property of Addition A + B = B + A**

 **Associative Property of Addition (A + B) + C = A + (B + C)**

 **Distributive Property c(A + B) = cA + cB**

**Examples.**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**4.3 Multiplying Matrices p 177**

**You can multiply two matrices if and only if the number of columns is equal to the number of rows in the second matrix.**

**When you multiply two matrices \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the resulting**

**matrix \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.**

**The product of two matrices is found by multiplying corresponding columns and rows.**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Examples.**

**Recall that the same properties for real numbers also held true for matrix addition. Some of these properties do *not* always hold true for matrix multiplication.**

**Commutative Property does not always hold true for matrix multiplication!**

**Properties of Matrix Multiplication**

**For any matrices A, B, and C for which the matrix products are defined, and any scalar c, the following properties are true:**

**Associative Property of Matrix Multiplication (AB)C = A(BC)**

**Associative Property of Scalar Multiplication c(AB) = (cA)B = A(cB)**

**Left Distributive Property C(A + B) = CA + CB**

**Right Distributive Property (A + B)C = AC + BC**

**Examples.**