Algebra 2 Lesson 4-1: Organizing Data into Matrices Mrs. Snow, Instructor

A **matrix** is a rectangular array of numbers arranged in rows by columns. Mountains of real world data may be quickly processed when arranged in this rectangular format.

Each element or entry in a matrix has a specific location or address, read as a "row by column" location.

Example: $\begin{array}{ccc} 3 & -2 & 5 \\ 4 & 0 & 1 \end{array}$ The entry in the 2nd row, 3rd column, is identified as **e**₂₃=1.

The size or **dimension** of a matrix is simply the number of rows by the numbers of columns: RxC. Thus, the size of the matrix in the example above is 2 by 3 or 2 x 3. Two matrices are equal **if and only if** they are the same size **and** their corresponding matrix elements are identical or equivalent.

Consider the data sets below for Aaron's Service Center.

ŀ	Auto Parts		Mechanic Services			
Store #	2010	2011		Store #	2010	2011
103	\$143,000	\$188,000		103	\$245,000	\$305,000
205	\$217,000	\$195,000		205	\$486,000	\$475,000
135	\$93,000	\$135,000		135	\$204,000	\$193,000

What is Aaron's total revenue (parts + service) for Store #103 in 2010?	What is Aaron's total revenue (parts + service) for Store #205 in2011?	What is Aaron's total revenue (parts + service) for Store #103 in 2011?
total revenue=parts+ services	total revenue=parts+ services	total revenue=parts+ services
R =	R =	<i>R</i> =
143,000 + 245,000 = \$388,000	195,000 + 475,000 = \$670,000	135,000 + 193,000 = \$328,000

Notice that order of the entries is important. Each store has a specific set of data. High speed computers can now add millions of such entries in seconds. This process is called **matrix addition or subtraction**. Matrix addition/subtraction is the process of adding or subtracting corresponding entries. Thus, Aaron's Service Center data can be translated (in thousands of dollars) into matrix form (numerical data is transferred into the matrix):

	Parts _		Se	rvice		Rev	enue		<u>_</u>	~
143	188		245	305		(143 + 245)	(188 + 305)		388	493
217	195	+	486	475	=	(217 + 486)	(195 + 475)	=	703	670
93	135		205	193		(93 + 205)	(135 + 193)]	298	328
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Matrix operations also obey the commutative and associative properties as well as the additive identity and additive inverse.

1. a) convert the data set into a matrix

b) What are the dimensions of the matrix?

c) The entry n₃₂ is ____

2004 Men's Olympic Gymnastics Individual Medal Winners

Gymnast	Floor	Pommel	Still	Vault	Parallel	Horizontal
	Exercise	Horse	Rings		Bars	Bars
Paul	9.725	9.700	9.587	9.137	9.837	9.837
Hamm						
Dae Eun	9.650	9.537	9.712	9.412	9.775	9.725
Kim						
Tae-	9.512	9.650	9.725	9.700	9.712	0.475
Young						
Yang						

2. The data represents a manufacturer's shipment records

- a) Display the data in matrix form, with columns representing years.
- b) What a23?

c) How many CDs were sold over the 6-year period?

d) How many CDs and DVDs were sold in 2001?

Туре	1998	1999	2000	2001	2002	2003
CD	847.0	938.9	942.5	881.9	803.3	745.9
DVD	0.5	2.5	3.3	7.9	10.7	17.5

3. Solve each equation for the variable (corresponding elements are equal)

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3x+2	5	2a		8	2n – 10	0
-18	6	5y+3	=	c	3k	-7