

Date:

Chapter: Chapter 4:1 - Introduction to Matrices

Objectives: Organize data into matrices
Use matrix row and column operations to analyze data

Notes:

Julie is shopping for a new smart phone and discovers that many different options are available. She wants to be able to easily compare the options, so she decides to organize the data in a matrix. Organize the following data in a matrix.

<u>Choice 1</u>	<u>Choice 2</u>	<u>Choice 3</u>	<u>Choice 4</u>
\$420	\$399	\$315	\$289
512 RAM	512 RAM	256 RAM	128 RAM
24 pixels	24 pixels	24 pixels	18 pixels
infrared	bluetooth	infrared	wi-fi

Handwritten matrix representation:

	choice1	choice2	ch3	ch4
Price	\$420	\$399	\$315	\$289
RAM	512	512	256	128
Pixels	24	24	24	18
Connection	infrared	bluetooth	infrared	wi-fi

***Matrix** = Rectangular arrangement of variables and/or constants in rows and columns enclosed in brackets.

***Element** = Each value in a matrix.

***Dimensions** = # of rows and columns in a matrix; always RxC!!!

-Ex:

Handwritten example of a 2x3 matrix:

$$A = \begin{matrix} R & C & C \\ R & \begin{bmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \end{bmatrix} & \end{matrix} \quad 2 \times 3$$

Four Types of Matrices

1) Row

2) Column

3) Square

4) Zero

Handwritten row matrix: $[x \ x \ x]$

Handwritten column matrix: $\begin{bmatrix} x \\ x \\ x \end{bmatrix}$

Handwritten square matrix: $\begin{bmatrix} x & x \\ x & x \end{bmatrix}$
 R=C!

Handwritten zero matrix: $\begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$

***Equal Matrices** = Same dimensions and corresponding elements are equal.

Handwritten example of unequal matrices: $\begin{bmatrix} 3 & 1 \\ 2 & 6 \end{bmatrix} \neq \begin{bmatrix} 3 & 2 \\ 1 & 6 \end{bmatrix}$

Examples:

Ex. 1

Use $A = \begin{matrix} & C & C \\ R & 10 & -8 \\ R & -2 & 19 \\ R & 6 & -1 \end{matrix}$ to answer the following:

- a) State the dimensions b) Find the value of b_{32}
 3×2 -1

Ex. 2

The figure shows the prices of small, medium, and large subs.

	Small	Medium	Large
Ham	\$3.50	\$5.50	\$8.00
Meatball	\$4.00	\$6.50	\$9.00
Turkey	\$3.75	\$6.00	\$8.75
Roast Beef	\$3.25	\$5.00	\$7.75

- a) Organize the data in a matrix listing subs from least to most expensive.

	Roast	Ham	Turkey	Meatball
SM	3.25	3.50	3.75	4.00
MD	5.00	5.50	6.00	6.50
LG	7.75	8.00	8.75	9.00

- b) State the dimensions c) Find the value of a_{21}
 3×4 5.00

Ex. 3

The table displays some of the US Census Data.

Latino Populartion in Millions

Age	Male	Female
0-19	7.1	6.6
20-39	6.8	5.9
40-59	3.2	2.2
60+	1.1	1.4

- a) Organize the data in a matrix

	Male	Female
0-19	7.1	6.6
20-39	6.8	5.9
40-59	3.2	2.2
60+	1.1	1.4

- b) Add the elements in the columns and interpret.

column 1 = 18.2
 column 2 = 16.1

- c) Add the elements in the rows and interpret.

row 1 = 13.7 row 3 = 5.4
 row 2 = 12.7 row 4 = 2.5

- d) Find the average of the rows and columns. Is it meaningful?

column 1 = 4.55 row 3 = 1.35
 column 2 = 4.03 row 4 = 0.62
 row 1 = 6.85

Homework:

Average (+13) --> p. 188 (#9-21)

Advanced (+20) --> p. 189 (#22-37, 41-44)