



Lesson 4.1:  
Using Matrices to  
Represent Data

- Matrices: (plural for matrix) used to represent information
- Dimensions: # of horizontal rows by # of vertical columns (r x c)

ex:  $A = \begin{matrix} & \overset{1}{1} & \overset{2}{4} \\ \underset{2}{=} & \begin{bmatrix} 1 & 4 \\ 2 & 5 \\ 3 & 6 \end{bmatrix} & \\ \underset{3}{\circlearrowleft} & & \end{matrix}$   $3 \times 2$

- Entry (element): each # in the matrix

ex:  $a_{31} =$  matrix A, row 3, column 1

$a_{31} = 3$

## Adding & Subtracting Matrices

- Dimensions must be the same
- Add or subtract corresponding entries

## Scalar Multiplication

- Multiply every entry in the matrix by the same #.

Given:  $A = \begin{bmatrix} -2 & 0 & 1 \\ 5 & -7 & 8 \end{bmatrix}$   $B = \begin{bmatrix} 5 & 7 & -1 \\ 0 & 2 & -8 \end{bmatrix}$

1)  $A + B$

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

Given:  $A = \begin{bmatrix} -2 & 0 & 1 \\ 5 & -7 & 8 \end{bmatrix}$      $B = \begin{bmatrix} 5 & 7 & -1 \\ 0 & 2 & -8 \end{bmatrix}$

2)  $B - A$

$$\begin{bmatrix} 7 & 7 & -2 \\ -5 & 9 & -16 \end{bmatrix}$$

Given:  $M = \begin{bmatrix} -5 & 9 \\ 11 & -1 \end{bmatrix}$   $N = \begin{bmatrix} 2 & 6 \\ -2 & 10 \end{bmatrix}$

3)  $3M$

$$\begin{bmatrix} -15 & 27 \\ 33 & -3 \end{bmatrix} - \begin{bmatrix} 2 & 6 \\ -2 & 10 \end{bmatrix}$$

4)  $3M - N$

$$\begin{bmatrix} -17 & 21 \\ 35 & -13 \end{bmatrix}$$

Solve for x & y.

$$5) \begin{bmatrix} 2x + 4 & 5 \\ -2 & -3y + 5 \end{bmatrix} = \begin{bmatrix} 12 & 5 \\ -2 & 5y - 3 \end{bmatrix}$$

$$\begin{array}{r} 2x + 4 = 12 \\ -4 \quad -4 \\ \hline 2x = 8 \\ \frac{2}{2} \quad \frac{2}{2} \\ x = 4 \end{array}$$

$$\begin{array}{r} -3y + 5 = 5y - 3 \\ 3y \quad \quad 3y \\ \hline 5 = 8y - 3 \\ -3 \quad \quad +3 \\ \hline 8 = 8y \\ \frac{8}{8} \quad \frac{8}{8} \quad y = 1 \end{array}$$

# HOMEWORK:

p.221 #13-45 (ODD)