

3.5 Basic Matrix Operations

$$\left. \begin{array}{l} 3x + 2y = 1 \\ 5x - 4y = -13 \end{array} \right\} \begin{array}{l} \text{can be} \\ \text{shown as} \end{array} \begin{bmatrix} 3 & 2 & 1 \\ 5 & -4 & -13 \end{bmatrix} = A$$

Matrix - rectangular arrangement of #'s in rows & columns
 \leftrightarrow \downarrow

The dimensions are given as rows \times columns.

ex. A's dimensions are 2 rows by 3 columns or 2 \times 3

$$\begin{array}{l} - \begin{bmatrix} 1 & 4 \\ -3 & 0 \\ 8 & -17 \end{bmatrix} \quad \begin{bmatrix} 6 & 0 & -7 & 12 \\ -1 & 8 & -23 & 99 \end{bmatrix} \\ \quad \quad \quad \begin{matrix} 3 \times 2 \\ R \times C \end{matrix} \quad \quad \quad \begin{matrix} 2 \times 4 \\ R \times C \end{matrix} \end{array}$$

Element - #'s inside the matrix

Adding & Subtracting

* Can only do if matrices have same dimensions

$$\begin{bmatrix} a & c \\ b & d \end{bmatrix} + \begin{bmatrix} e & g \\ f & h \end{bmatrix} = \begin{bmatrix} a+e & c+g \\ b+f & d+h \end{bmatrix}$$

$$\begin{bmatrix} 3 & 0 \\ -5 & -1 \end{bmatrix} + \begin{bmatrix} -1 & 4 \\ 2 & 10 \end{bmatrix} = \begin{bmatrix} 3+(-1) & 0+4 \\ -5+2 & -1+10 \end{bmatrix} = \begin{bmatrix} 2 & 4 \\ -3 & 9 \end{bmatrix}$$

p191: 5, 11, odd, 14,
18, 21, 24, 31, 33

Multiply by a Scalar

* All elements get multiplied by it \rightarrow Think distributive prop

$$a) \quad -2 \begin{bmatrix} 4 & -1 \\ 1 & 0 \\ 2 & 7 \end{bmatrix} \rightarrow \begin{bmatrix} -2(4) & -2(-1) \\ -2(1) & -2(0) \\ -2(2) & -2(7) \end{bmatrix} = \begin{bmatrix} -8 & 2 \\ -2 & 0 \\ -4 & -14 \end{bmatrix}$$

$$b) \quad 4 \begin{bmatrix} -2 & -8 \\ 5 & 0 \end{bmatrix} + \begin{bmatrix} -3 & 8 \\ 6 & -5 \end{bmatrix} = \begin{bmatrix} -8 & -32 \\ 20 & 0 \end{bmatrix} + \begin{bmatrix} -3 & 8 \\ 6 & -5 \end{bmatrix} = \begin{bmatrix} -11 & -24 \\ 26 & -5 \end{bmatrix}$$