

# **Lesson 3**

## **Scalar Multiplication**

- Real numbers are referred to as scalars.
- The term scalar multiplication refers to the product of a real number and a matrix. In scalar multiplication, each entry in the matrix is multiplied by the given scalar.



## Example 1

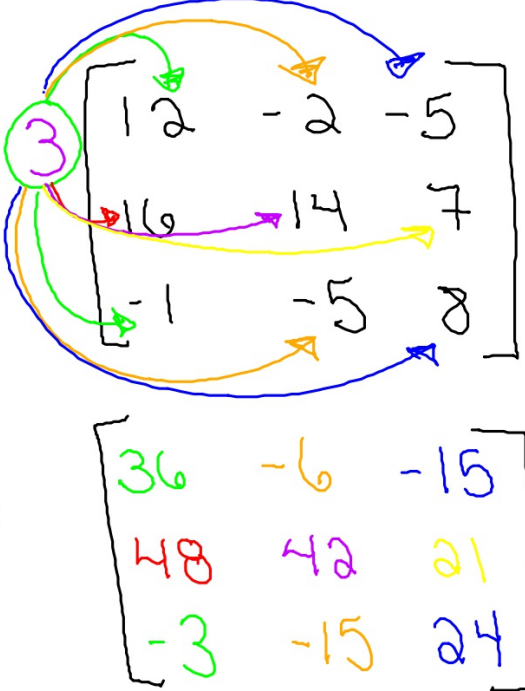
$$A = \begin{bmatrix} 3 & 5 \\ -2 & 11 \end{bmatrix}$$

$$5A = \begin{bmatrix} 5 & 3 & 5 \\ -2 & 11 \end{bmatrix}$$

$$= \begin{bmatrix} 15 & 25 \\ -10 & 55 \end{bmatrix}$$

## Example 2

$$C = \begin{bmatrix} 12 & -2 & -5 \\ 16 & 14 & 7 \\ -1 & -5 & 8 \end{bmatrix}$$

$$3C = \begin{bmatrix} 36 & -6 & -15 \\ 48 & 42 & 21 \\ -3 & -15 & 24 \end{bmatrix}$$


### Example 3

$$K = \begin{bmatrix} -1 & 0 \\ 9 & -6 \end{bmatrix}$$

$-8K =$

$$\begin{bmatrix} -1 & 0 \\ 9 & -6 \end{bmatrix}$$

$=$

$$\begin{bmatrix} 8 & 0 \\ -72 & 48 \end{bmatrix}$$

### Example 4

$$A = \begin{bmatrix} 2 & -5 \\ 1 & 9 \end{bmatrix} \quad B = \begin{bmatrix} 3 & 2 \\ 6 & -1 \end{bmatrix}$$

$$3A - 7B = 3 \begin{bmatrix} 2 & -5 \\ 1 & 9 \end{bmatrix} - 7 \begin{bmatrix} 3 & 2 \\ 6 & -1 \end{bmatrix}$$

$$= \begin{bmatrix} 6 & -15 \\ 3 & 27 \end{bmatrix} + \begin{bmatrix} -21 & -14 \\ -42 & 7 \end{bmatrix}$$

$$= \begin{bmatrix} -15 & -29 \\ -39 & 34 \end{bmatrix}$$