Scalar Multiplication of Matrix

To multiply a matrix by a scalar, we do **not** need to verify

- Dimensions or
- Indices

Simply multiply each element in the matrix by the scalar!

For example:

$$\alpha A = \begin{bmatrix} \alpha a_{11} & \alpha a_{12} & \alpha a_{13} & .. & \alpha a_{1n} \\ \alpha a_{21} & \alpha a_{22} & \alpha a_{23} & .. & \alpha a_{2n} \\ \alpha a_{31} & \alpha a_{32} & \alpha a_{33} & .. & \alpha a_{3n} \\ \vdots & & & & \\ \alpha a_{m1} & \alpha a_{m2} & \alpha a_{m3} & ..... & \alpha a_{mn} \end{bmatrix}$$

Equation 13

Quiz

What is the value of the ij{ij}ijth element of Matrix DDD if:

$$D = 0.2A + (-5)B - 2C$$

a. $i = 1, j = 1$

b. $i = 2, j = 4$

$$A = \begin{bmatrix} 3 & 0.6 & 4 & -3 \\ -1.3 & 4 & 0 & 8.6 \\ 7 & 0 & -8 & 0.006 \end{bmatrix}$$

$$B = \begin{bmatrix} 3 & -5.76 & 45 & 0 \\ 2 & -2 & 1.3 & 9 \\ -9 & 0 & 0 & 1 \end{bmatrix}$$

$$C = \begin{bmatrix} 0 & 1009 & -66.7849 & 90 \\ 0 & 5 & 4 & -0.07 \\ 0 & 0 & 0 & 0 \end{bmatrix}$$

Answer:

a. -14.4
b. -43.14

Notice that the equation: $D = 0.2A + (-5)B - 2C$ represents a **linear combination** of matrices and scalars.