

1. Be familiar with matrix notation and terminology
  2. Perform matrix addition/subtraction and multiplication of a matrix by a scalar
  3. Understand when matrix operations are possible based on dimensions
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What is a Matrix?

Matrix Addition/Subtraction:

Do dimensions matter?

Matrix Transpose:

### Problem 1

Use the following matrices and scalars to answer the problems below. If the mathematical operations is not defined, explain why. **Do two from each part.**

$$\begin{aligned} A &= \begin{bmatrix} 1 & 4 & -5 \\ 3 & 2 & 1 \end{bmatrix} & B &= \begin{bmatrix} 5 & 0 & -1 \\ 2 & 3 & 4 \end{bmatrix} & C &= \begin{bmatrix} 2 & 8 \\ 7 & 2 \\ 1 & 8 \end{bmatrix} & D &= \begin{bmatrix} 3 & 1 \\ 1 & 5 \\ 4 & 9 \end{bmatrix} \\ E &= \begin{bmatrix} 0.6 & -0.7 \\ -0.2 & 0.4 \end{bmatrix} & F &= \begin{bmatrix} 4 & 7 \\ 2 & 6 \end{bmatrix} & G &= \begin{bmatrix} 0 & -3 & -2 \\ 1 & -4 & -2 \\ -3 & 4 & 1 \end{bmatrix} & H &= \begin{bmatrix} 4 & -5 & -2 \\ 5 & -6 & -2 \\ -8 & 9 & 3 \end{bmatrix} \\ I_2 &= \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix} & I_3 &= \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix} & w &= 4 & x &= 5 & y &= 0.1 & z &= 0.5 \end{aligned}$$

#### a) Scalar Multiplication

i.  $wA =$

ii.  $Bx =$

iii.  $(yH)^T =$

iv.  $(wzy)F =$

v.  $wF + zF =$

- When you multiply a matrix by a scalar, is the result a scalar or a matrix?
- Does the order matter?

#### b) Matrix Addition & Subtraction

i.  $A + B =$

$B + A =$

ii.  $C - D =$

$-D + C =$

iii.  $G - H =$

$H - G =$

iv.  $C - B =$

$F + E =$

- When we add/subtract matrices, is the result a scalar or a matrix?
- Does the order in which we add matrices matter?
- Does the dimensions of the matrices matter?