

3. When can you **add** two matrices? How is this accomplished? Give an example of matrices A and B such that $A + B$ exists. Find $A + B$ in this case. Give an example of matrices A and B such that $A + B$ does not exist. How do we denote the addition of two matrices, say $A + B$ where A and B are $m \times n$ matrices, in algebraic terms? How do you think we would **subtract** two matrices? When is it possible to subtract two matrices? For the two matrices A and B such that $A + B$ exists, find $A - B$.

4. What is a **scalar**? How do you **multiply** a matrix by a scalar? Give an example of a matrix and then multiply your matrix by the scalar 2. How do denote this operation in general, that is, what is the algebraic notation for sA where s is a scalar and A is an $m \times n$ matrix?

5. What is the **zero matrix**? What notation is used for the zero matrix?

6. Let A , B , and C be $m \times n$ matrices. Let s and t be scalars. Complete the following:

(a) $A + B =$ _____ Matrix addition is _____

(b) $(A + B) + C =$ _____ Matrix addition is _____

(c) $A + O =$ _____

(d) $A + (-A) =$ _____

(e) $(st)A =$ _____

(f) $s(A + B) =$ _____

(g) $(s + t)A =$ _____

7. What is the **transpose** of an $m \times n$ matrix A ? What notation is used? Which matrices have transposes? Give an example of a matrix A and find its transpose.

8. Let A and B be $m \times n$ matrices. Let s and t be scalars. Complete the following:

(a) $(A + B)^T =$ _____

(b) $(sA)^T =$ _____

(c) $(A^T)^T =$ _____

9. What is **row vector**? What is a **column vector**? Give an example of a row vector and a column vector. What are the sizes of your two vectors? What are the entries of a vector called? What is \mathbb{R}^n ? What two operations can we do with vectors?