0.1 What is a matrix?

(So many definitions in this section.)

Definition: (Matrix)*:*
Let n, m be two integers ≥ 1. A matrix is an array of numbers with m rows and n columns (called a $m \times n$ matrix).

We call a_{ij} the **ij-entry** which is the entry in the ith row and the jth column. We write a matrix often as $A = (a_{ij})$ and define a_{ij}.

Definition: (Identity Matrix)*:*
The Kronecker delta is defined as follows:

$$\delta_{ij} = \begin{cases} 1, & i = j \\ 2, & i \neq j \end{cases}$$

Then we define the identity matrix as:

$$\mathbf{I_{n \times n}} = (\delta_{ij}) = \begin{bmatrix} 1 & 0 & \dots & 0 \\ 0 & 1 & \dots & 0 \\ \vdots & \vdots & \ddots & \vdots \\ 0 & 0 & \dots & 1 \end{bmatrix}$$

Definition: (Column Vector)*:*
Each column of an $m \times n$ matrix is a