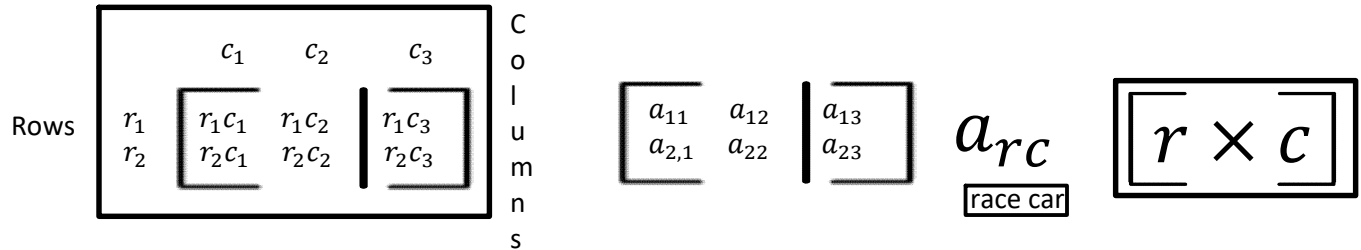
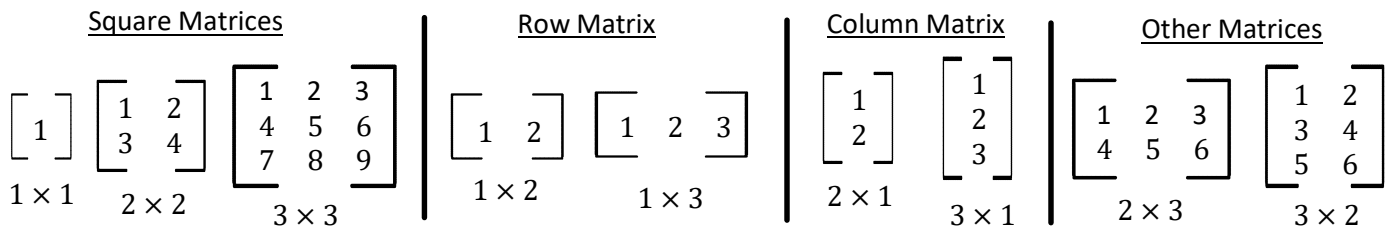


# LA - 1.1 - Matrix/Matrices Definition

Matrix - a rectangular array of numbers (Entries) of any Size (Dimensions)



*Identity Matrix  $I_n$  – an  $n \times n$  square matrix with all zeros and ones from top left diagonal down to the bottom right.*

Identity Matrices

$\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$	$\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$	$\begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$	<p>Rule #1 <math>I_n \cdot A = A \cdot I_n</math></p>
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$\begin{bmatrix} 1 & 5 & 0 \\ 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} 1 \\ 2 \end{bmatrix}$	$x + 5y + 0z = 1$ $0x + 0y + z = 2$	<table border="1" style="margin: auto;"> <tr><th><math>x</math></th><th><math>y</math></th><th><math>z</math></th></tr> <tr><td>1</td><td>0</td><td>2</td></tr> <tr><td>6</td><td>-1</td><td>2</td></tr> <tr><td>-4</td><td>1</td><td>2</td></tr> </table>	$x$	$y$	$z$	1	0	2	6	-1	2	-4	1	2	$x + 5y = 1$ $(1) + 5y = 1$ $5y = 0$ $y = 0$ $(1, 0, 2)$
$x$	$y$	$z$													
1	0	2													
6	-1	2													
-4	1	2													

$\begin{bmatrix} 1 & 5 & 0 \\ 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} a \\ b \end{bmatrix}$	$x + 5y = a$ $z = b$	$x \in \mathbb{R}$ $y \in \mathbb{R}$	Infinite Solutions
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$\begin{bmatrix} 0 & 0 & \dots & 0 \end{bmatrix} \begin{bmatrix} a \end{bmatrix}$	$a \neq 0$	No Solution
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