

Identity Matrix

Name: _____ Date: _____

The identity matrix is the matrix equivalent of the number “1”

For example a $n \times n$ identity matrix looks like

$$I_1 = [1], \quad I_2 = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}, \quad I_3 = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}, \quad I_n = \begin{bmatrix} 1 & 0 & 0 & \cdots & 0 \\ 0 & 1 & 0 & \cdots & 0 \\ 0 & 0 & 1 & \cdots & 0 \\ \vdots & \vdots & \vdots & \ddots & \vdots \\ 0 & 0 & 0 & \cdots & 1 \end{bmatrix}$$

Key features:

- It is “**square**” (has the same number of rows and columns)
- It has **1s** on the diagonal and **0s** everywhere else.
- It’s symbol is the capital letter ***I***.

Note, the identity matrix can be any size: 2×2 , 3×3 , 4×4 , etc.

Any matrix multiplied by the identity matrix is the matrix itself (like multiplying by 1).

Try these:

Given that

$$A = \begin{bmatrix} 3 & -1 \\ 0 & 5 \end{bmatrix}, \text{ calculate } A \times I$$

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