

Simple matrix without brackets

$$\begin{array}{cc} 1 & 0 \\ 0 & 1 \end{array}$$

Matrix with incorrect brackets

$$[\begin{array}{cc} 1 & 0 \\ 0 & 1 \end{array}]$$

Matrix with correct brackets

$$\left[\begin{array}{cc} 1 & 0 \\ 0 & 1 \end{array}\right]$$

Matrix inline with other items:

$$f(x) = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$$

Matrix with complex items as cells:

$$f(x) = \left[\begin{array}{cc} \left(\frac{1}{\sqrt{x}}\right) & \int_b^a \frac{1}{3}x^3 \\ \frac{1}{x} & \lambda \end{array}\right]$$