More on displayed formulas with LaTeX. Authors can typset displayed formulas with \{equation} (known as an equation environment), and furthermore number with \begin{equation} and internally label (reference) equations with \label{E:uniqueReference}, as shown below:

$$\int_0^\pi \sin x \, dx = 2 \tag{1}$$

The reference in the typsetted document can be demonstrated with \ref and \pageref:

"Please refer to (1) on page 1."

Note that the source file will need to be typset **twice** in order to get the references updated. The use of `E:` is only a convention for **E**quations.

It is possible to build equations without numbering by introducing an asterisk, as \begin{equation*}. This would be equivalent to \[. Indeed, it may prove more useful to do this for documents with a large number of equations, where the author then decides which to number and which not to, by deleting the asterisk.

The above equation numbers are updated automatically by LaTeX, as *relative* numbering. It is also possible to assign an *absolute* numbering, as a tag, with \tag{absoluteId}:

$$\int_0^\pi \sin x \, dx = 2 \tag{intOne}$$

The alignment of equations for derivations can be realised with \begin{align} (known as the align environment). The *alignment point* is applied with & and the line separator is given by two backslashes.

$$2x - 5y = 8$$
$$3x + 9y = -12$$

Removing the asterisks will yield numbered equations:

$$2x - 5y = 8 \tag{2}$$
$$3x + 9y = -12 \tag{3}$$

Finally, leave out numbering for select equations with \notag:

$$2x - 5y = 8$$
$$3x + 9y = -12 \tag{4}$$

To annotate a line with two ampersands (e.g. for working):

$$x = x \wedge (y \vee z) \qquad \text{(by distributivity)} \tag{5}$$

Cases can be typset like a matrix with \begin{cases} inside an equation or align environment as follows:

$$f(x) = \begin{cases} -x^2, & \text{if } x < 0; \\ \alpha + x, & \text{if } 0 \le x \le 1; \\ x^2, & \text{otherwise.} \end{cases}$$