Maths with amsmath

The amsmath package provides much more advanced math capability compared to basic LaTeX. While it provides many environments in which to display maths, I am only showing a small number of them in this document.

The most versatile environment for displaying maths is `align`. It allows multiple lines of maths (numbering each line), with an alignment point for (optional) multiple columns.

The basic environment, without an equation number (by using the 'starred' version of the environment, `align*`). Without alignment, the equation is centred, the same as using `\[...\]`:

$$a + b = c + d$$

Use the familiar `\\` to start a new line, and an ampersand (`&`) for alignment:[1]

$$a + b = c + d \tag{1}$$
$$e = f + g + h \tag{2}$$

With multiple columns:

$$a = b + c \qquad j = k + l + m \qquad u + v = w \tag{3}$$
$$d + e = f \qquad n + o + p = q \qquad x = y + z \tag{4}$$

The amsmath package defines the `split` environment to break a single equation over multiple lines. See now how easy it is to align the three lines when the alignment point lies *after* the equals sign:

$$x = y + z \tag{5}$$
$$\begin{aligned} a &= b + c \\ &\quad + d + e \end{aligned} \tag{6}$$

I find these two environments sufficient for almost everything. Look at one of the various maths guides for other environments the amsmath package provides if `align` and `split` do not serve your purposes.

[1] I align my equations *after* the equals sign, for reasons that become clear later; for correct spacing, empty curly braces must be inserted before the ampersand.