The equation for a straight line is

$$y = mx + b \tag{1}$$

and the equation for a polynomial is

$$y = \sum_{n=0}^{\infty} a_n x^n \tag{2}$$

Equation 1 and eq. 2 are known to all first-year math students.

The Fourier series is a little more advanced:

$$y = \frac{1}{2}a_0 + \sum_{n=1}^{\infty} a_n \cos(nx) + \sum_{n=1}^{\infty} b_n \cos(nx) \tag{3}$$

Equations 1–3 are used throughout science and engineering.

Equations can be left unnumbered if we do not need to refer to them:

$$y = Ae^{-\gamma t}\cos(2\pi f t)$$

It is also possible to number equations generically without planning to refer to them; e.g.:

$$\pi = 3.14159265358979323846264 3\ldots \tag{4}$$