In this case, the Σ symbol lets us know that this is a sum. The $i = 1$ serves two functions. It tells us that the index variable is i, and that i has a starting value of 1. The 10 is the final value, and the $(i + 2)$ to the right of the Σ is the formula. The i in the formula, takes each integer value from the starting value (1) to the final value (10). Therefore we have:

$$\sum_{i=1}^{10}(i+2) = 3+4+5+6+7+8+9+10+11+12 = 75.$$

♦

This notation has a lot of flexibility. For example, the sum's formula can be a constant value:

$$\sum_{i=1}^{10} 5 = 5+5+5+5+5+5+5+5+5+5 = 50.$$

Or we could have the index as an exponent:

$$\sum_{i=1}^{10}(2^i) = 2^1+2^2+2^3+2^4+2^5+2^6+2^7+2^8+2^9+2^{10}$$

Now all the examples so far have a numerical value that can be calculated. However, summation notation can also be used to express functions of variables such as:

$$\sum_{i=1}^{10}(x^i) = x^1+x^2+x^3+x^4+x^5+x^6+x^7+x^8+x^9+x^{10}$$

Note that any variables in the formula that do not match the index are left as variables (such as x in the previous example). While we do not know what the sum value is other than in terms of x, we can much more concisely state the sum in sigma notation.

Another typical use for the index in the formula is to denote an index in a coefficient. Consider the polynomial:

$$ax^2 + bx + c.$$

Instead of using a different letter, we can use a subscript to denote a different value but use the same letter:

$$a_2x^2 + a_1x + a_0.$$