4) Calculate the regression coefficient, r, for x and y.

Using the values for zix and ziy, and the equation for r:

$$r=\frac{1}{n-1}\sum\_{i=1}^{n}z\_{i\_{x}}z\_{i\_{y}}$$

$$r=\frac{1}{7}\left(z\_{1\_{x}}z\_{1\_{y}}+z\_{2\_{x}}z\_{2\_{y}}+z\_{3\_{x}}z\_{3\_{y}}++z\_{4\_{x}}z\_{4\_{y}}+…+z\_{n\_{x}}z\_{n\_{y}}\right)$$

$$r=\frac{1}{7}\left(\left(-1.5\right)\left(-1\right)+\left(0\right)\left(-0.5\right)+\left(-1\right)\left(-1\right)+\left(-0.5\right)\left(-0.5\right)+…+\left(1.5\right)\left(1.5\right)\right)$$

$$r=\frac{1}{7}\*6.5= 0.928571$$

Sigma Operator

Symbols in math, like +, -, ÷, etc. are called *operators.* ∑ is the ‘sigma operator’

The sigma operator sums whatever is in the argument based on the indices, i, the lower bound (in this case 1) and n, which marks the upper bound. So, for data set {z1, z2, z3,…zn},

$\sum\_{i=1}^{n}z\_{i}$ means “sum all z’s starting from 1 and continue to n,” or

$$\sum\_{i=1}^{n}z\_{i}= z\_{1}+z\_{2}+z\_{3}+…+z\_{n}$$

Notice that the lower and upper bounds can be anything you choose, and the indice can also be used in the argument in a mathematic sense (not just and index):

$$\sum\_{i=2}^{4}z\_{i}= z\_{2}+z\_{3}+z\_{4}$$

 $$\sum\_{k=1}^{6}kz\_{k}= z\_{1}+2z\_{2}+3z\_{3}+4z\_{4}-5z\_{5}+6z\_{6}$$

 I replaced *i* with *k*, just to show you can index with any letter. *i* is a popular choice.