Sigma notation

Things you need to learn to do

- Use of sigma notation to express sums of sequences.
- Convert between the sigma notation and explicitly written sum.

Sigma notation

Capital Greek letter sigma $\sum$ is a shorthand for sum. The notation involves the starting point, the end point and the formula:

$$\sum_{n=1}^{4} n^2$$

Here n is our counter, we could have used any letter. The counter starts at 1 and finishes at 4. The counter always increases by 1. We substitute the current value of the counter into the given formula, in our case it is n^2 and we add up the results. So we should get:

$$\sum_{n=1}^{4} n^2 = 1^2 + 2^2 + 3^2 + 4^2 = 1 + 4 + 9 + 16 = 30$$

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Sigma notation

$$\sum_{i=2}^{3} 2i$$

Start: 2, end: 3, formula $2i$. We get:

$$\sum_{i=2}^{3} 2i = 2 \times 2 + 2 \times 3 = 4 + 6 = 10$$

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Sigma notation

$$\sum_{k=0}^{5} 2^k$$

Start: 0, end: 5, formula 2^k. We get:

$$\sum_{k=0}^{5} 2^k = 2^0 + 2^1 + 2^2 + 2^3 + 2^4 + 2^5 = 1 + 2 + 4 + 8 + 16 + 32 = 63$$

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Sigma notation

$$\sum_{n=1}^{3} \frac{1}{n}$$

Start: 1, end: 3, formula $\frac{1}{n}$. We get:

$$\sum_{n=1}^{3} \frac{1}{n} = \frac{1}{1} + \frac{1}{2} + \frac{1}{3} = \frac{11}{6}$$

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Sigma notation

$$\sum_{k=-2}^{2} |k|$$

Start: -2, end: 2, formula $|k|$. We get:

$$\sum_{k=-2}^{2} |k| = |-2| + |-1| + |0| + |1| + |2| = 6$$

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Sigma notation

$$\sum_{m=2}^{5}(m^2-5)$$

Start: 2, end: 5, formula $m^2 - 5$. We get:

$$\sum_{m=2}^{5}(m^2-5) = (2^2-5)+(3^2-5)+(4^2-5)+(5^2-5) = -1+4+11+20 = 34$$

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If you have any questions or doubts email me at T.J.Lechowski@gmail.com