

# 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

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

# Sigma notation

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

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Start: 2,

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

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

# Sigma notation

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

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Start: 0,



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Start: 0, end: 5,

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

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

# Sigma notation

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

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

Start: 1,

# Sigma notation

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

Start: 1, end: 3,

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

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

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

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

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



# Sigma notation

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

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

Start: -2,

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

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

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

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

# Sigma notation

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

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

# Sigma notation

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

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

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

The short test at the beginning of the next class will consist of calculating a sum expressed in sigma notation.

If you have any questions or doubts email me at [T.J.Lechowski@gmail.com](mailto:T.J.Lechowski@gmail.com)