

SUMMATION NOTATION

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In calculus, we do a lot of adding. We will introduce two "fancy adding machines" in the next couple of days. The first one uses \sum and is called *Sigma Notation*.

Example:
$$\sum_{n=1}^5 (2n) = 2(1) + 2(2) + 2(3) + 2(4) + 2(5) = 30$$

Your turn! Find the sum of:

$$\sum_{k=3}^9 (k^2 + 1)$$

We have a few formulæ for sums that show up frequently.

$$\begin{aligned}\sum_{k=1}^n k &= \frac{n(n+1)}{2} \\ \sum_{k=1}^n k^2 &= \frac{n(n+1)(2n+1)}{6} \\ \sum_{k=1}^n k^3 &= \left[\frac{n(n+1)}{2} \right]^2\end{aligned}$$

Use what we know about sums and the above formulæ to evaluate

1. $\sum_{k=1}^{17} (2+k) =$

2. $\sum_{k=18}^{71} k(k-1) =$

3. $\sum_{k=1}^5 \frac{k^3}{225} + \left(\sum_{k=1}^5 k \right)^3 =$