

# Summation

Sigma notation

$$\sum_{i=1}^n a_i$$

$n$  ← ending @  $n$   
 $i=1$  ← starting @ 1  
 the thing we are iterating

$$\sum_{i=1}^n a_i = a_1 + a_2 + a_3 + a_4 + \dots + a_{n-1} + a_n$$

$$\sum_{i=1}^6 i = 1 + 2 + 3 + 4 + 5 + 6 = 21$$

$$\sum_{j=5}^{10} j^2 - 1 = (5^2 - 1) + (6^2 - 1) + 7^2 - 1 + 8^2 - 1 + 9^2 - 1 + 10^2 - 1$$

$$= 24 + 35 + 48 + 63 + 80 + 99 = \boxed{349}$$

$$\sum_{i=1}^5 a(i+1)$$

$$= 2a + 3a + 4a + 5a + 6a = \boxed{20a}$$

$$\frac{1}{7(5)} + \frac{1}{7(6)} + \frac{1}{7(7)} + \dots + \frac{1}{7n}$$

$$\sum_{i=5}^n \frac{1}{7i}$$

$$\left[1 - \frac{1}{5}\right]^2 + \left[1 - \frac{2}{5}\right]^2 + \dots + \left[1 - \frac{54}{5}\right]^2$$

$$\sum_{i=1}^{54} \left(1 - \frac{i}{5}\right)^2$$

$$\left[\left(\frac{4}{n}\right)^3 - \frac{4}{n}\right] \frac{5}{n} + \dots + \left[\left(\frac{4n}{n}\right)^3 - \frac{4}{n}\right] \frac{5n}{n}$$

$$\sum_{i=1}^n \left[\left(\frac{4i}{n}\right)^3 - \frac{4}{n}\right] \frac{5i}{n}$$



$$\sum_{i=1}^n c x_i = c \left( \sum_{i=1}^n x_i \right)$$

$$\sum_{i=1}^n x_i \pm y_i = \sum_{i=1}^n x_i \pm \sum_{i=1}^n y_i$$