

# The Fundamental Theorem of Summation Calculus

$$\sum_{a \leq x < b} f(x) = F(b) - F(a)$$

where  $F(x)$  is an “antidifference” of  $f(x)$ , i.e.,  $\Delta F(x) := F(x+1) - F(x) = f(x)$ . Here  $a$ ,  $b$ , and  $x$  are integers, and  $a \leq b$ .

This is equivalent to the Telescoping Sum Formula:

$$\sum_{a \leq x < b} \Delta F(x) = F(b) - F(a).$$