

Summation Example 60037

Evaluate
$$\sum_{a=4}^{34} (3a-1).$$

Solution:

Step 1: Change the dummy variable from

"a" to "k":
$$\sum_{k=4}^{34} (3k-1).$$

Step 2: Recognize that the summand (that is, $3k-1$) generates an arithmetic progression.

Step 3: Recall that the sum of an initial segment of an arithmetic progression is given by the formula n times the average of the first and last terms, where n is the length of the initial segment.

Step 4: Determine the first term by evaluating $3k-1$ for $k=4$: $3 \times 4 - 1 = 11$.

Step 5: Determine the last term by evaluating $3k-1$ for $k=34$: $3 \times 34 - 1 = 101$.

Step 6: Determine n by subtracting the lower limit from the upper limit, and adding 1: $n = 34 - 4 + 1 = 31$.

Step 7: Do the calculation:

$$31 \times \left(\frac{11 + 101}{2} \right) = 1736$$