# 1 P1

**Problem 1** *Calculate*

$$\sum_{n=1}^{100}(4n-3) \tag{1}$$

We can separate the sum into two summations, one from 1 to 50 and one from 51 to 100.

$$\sum_{n=1}^{100}(4n-3) = \sum_{n=1}^{50}(4n-3) + \sum_{n=51}^{100}(4n-3) \tag{2}$$

Then we make the substitution $n = 101 - i$, obtaining

$$\sum_{n=1}^{100}(4n-3) = \sum_{n=1}^{50}(4n-3) + \sum_{i=1}^{50}(4(101-i)-3) \tag{3}$$

Since both sums are from 1 to 50, we may re-join them to obtain

$$\sum_{n=1}^{100}(4n-3) = \sum_{n=1}^{50}(4n-3+4(101-n)-3) \tag{4}$$

Simplifying yields

$$\sum_{n=1}^{100}(4n-3) = \sum_{n=1}^{50} 398 = 50 * 398 = 19900 \tag{5}$$

# 2 P2

**Problem 2** *Let $f(x) = x+1$ and $g(x) = 2x-4$. Is there a number $C$ with the property that for all $x > C$, $g(x) > f(x)$?*

We claim that $C = 5$ works. Note that

$$g(x) > f(x) \iff g(x) - f(x) > 0$$

. Let $x > C = 5$. Then

$$g(x) - f(x) = (2x-4) - (x+1) = x - 5 > 0$$

Since $g(x) - f(x) > 0$, $g(x) > f(x)$.