B.10 Since $0^2 = 0$ and $1^2 = 1$, $g(x) = f(x)$. That is, it is the same indicator function.

B.13 $\sum_{i=1}^{99} [\![i \in S]\!] = |S|$. That is, it gives the cardinality of S.

B.14 Writing k for i_0,

$$\sum_{i=k}^{k+n-1} ar^i = ar^k + ar^{k+1} + \cdots + ar^{k+n-1} = ar^k\left(1 + r + \cdots + r^{n-1}\right) = ar^k \frac{1-r^n}{1-r}.$$

Also,

$$\sum_{i=k}^{\infty} ar^i = ar^k + ar^{k+1} + ar^{k+2} + \cdots = ar^k\left(1 + r + r^2 + \cdots\right) = \frac{ar^k}{1-r},$$

so long as $|r| < 1$ in the infinite series.

B.16 We have

$$\sum_{i=1}^{n}(2i-1) = 2\sum_{i=1}^{n} i - \sum_{i=1}^{n} 1 \overset{\text{uses result of B.15}}{=} 2 \cdot \frac{n(n+1)}{2} - \overbrace{(1+1+\cdots+1)}^{n \text{ summands}}$$

$$= n(n+1) - n = n^2.$$