(i). $\sum_{i=1}^{n} i^2 = \frac{n(n+1)(2n+1)}{6}$

Proof. Suppose $n = 1$, we have $1^2 = \frac{1(1+1)(2+1)}{6}$

Assume that for some positive integer $k, \sum_{i=0}^{k} i = \frac{k(k+1)(2k+1)}{6}$

$$\sum_{i=0}^{k+1} i^2 = \sum_{i=0}^{k} +(k+1)^2 = \frac{k(k+1)(2k+1)}{6} + (k+1)^2$$

□