

1. Summation Practice

(a)

$$\sum_{k=3}^{n+1} 1 = n - 1$$

(b)

$$\sum_{i=1}^{100} (4 + 3i)$$

$$n(a_1 + \frac{d(n-1)}{2}) \left\{ \begin{array}{l} a_1 = 7 \\ n = 100 \\ d = 3 \end{array} \right. \implies 100(7 + \frac{3(100-1)}{2}) = 15550$$

(c)

$$\sum_{i=1}^{200} (i-3)^2 = \sum_{i=1}^{200} (i^2 - 6i + 9)$$

$$\sum_{i=1}^{200} i^2 - 6(\sum_{i=1}^{200} i) + \sum_{i=1}^{200} 9$$

$$= \frac{200(200+1)(400+1)}{6} - 6 \left\{ \frac{200(200+1)}{2} \right\} + 9(200)$$

$$= 2567900$$

(d)

$$\sum_{i=10}^{80} (i^3 + i^2) = \sum_{i=10}^{80} i^3 + \sum_{i=10}^{80} i^2$$

$$\left( \sum_{i=1}^{80} i^3 - \sum_{i=1}^9 i^3 \right) +$$

$$\left( \sum_{i=1}^{80} i^2 - \sum_{i=1}^9 i^2 \right) \sum_{j=0}^{n-1} (j+1)$$

(e) Create a summation for the following sequence: 2+4+8+16+32+64

$$\sum_{j=0}^{n-1} (j+1)$$

(f) Create a summation for the following sequence: 2+6+18+54+162

$$\sum_{j=0}^{n-1} (j+1)$$

(g) Create a summation for the following sequence:  $(-4)+(-1)+2+5+8+11+14$

$$\sum_{j=0}^{n-1} (j+1)$$

2. Order of Growth

(a)

$$\sum_{i=2}^{n-1} lgi^2$$

(b)

$$\sum_{i=0}^{n-1} \sum_{j=0}^{i-1} (i+j)$$