

Exercises for practice:

From Section IS (Section 1) (page 157) in your text, do the following exercises:

1.1, 1.2, 1.3, 1.4, 1.6, 1.7, 1.8, 1.16.

These exercises have (as do all the exercises from the text) solutions in the Solutions section. I recommend that you try to do these exercises without first looking at the author's solution. Additionally it is recommended that you do the exercises completely, including writing up the solutions in your own words. When you try to write up a complete solution on your own, you will quickly find any gaps in your understanding.

Exercises to turn in:

1. Write each of the following sums without using the sum symbol \sum and evaluate the sum.

(a) $\sum_{i=1}^5 i^2$

(b) $\sum_{j=0}^2 3^{j+2}$

(c) $\sum_{k=-1}^4 (2k^2 - k + 1)$

2. Prove the following by induction:

$$\sum_{j=1}^n (j+1)2^j = n2^{n+1}, \quad \text{for } n \geq 1.$$

3. Prove the following by induction:

$$\left(1 - \frac{1}{2}\right) \left(1 - \frac{1}{3}\right) \left(1 - \frac{1}{4}\right) \cdots \left(1 - \frac{1}{n}\right) = \frac{1}{n}, \quad \text{for } n \geq 2.$$

4. Prove the following inequality by induction:

$$\left(1 + \frac{1}{2}\right)^n \geq 1 + \frac{n}{2}, \quad \text{for } n \geq 1.$$