Section 4.2

Sigma Notation: The sum of n terms $a_1, a_2, a_3, \ldots, a_n$ is written as

$$\sum_{i=1}^{n} a_i = a_1 + a_2 + a_3 + \cdots + a_n$$

where i is the **index of summation,** a_i is the ***i*th term** of the sum, and the **upper and lower bounds of summation** are n and 1.

Summation Formulas

1. $\sum_{i=1}^{n} c = cn, c$ is a constant
2. $\sum_{i=1}^{n} i = \frac{n(n+1)}{2}$
3. $\sum_{i=1}^{n} i^2 = \frac{n(n+1)(2n+1)}{6}$
4. $\sum_{i=1}^{n} i^3 = \frac{n^2(n+1)^2}{4}$

1) Find the following:

a) $\sum_{i=2}^{7} \frac{i+1}{i-1}$

b) $\sum_{k=0}^{5} (2k^2 + 1)$

c) $\sum_{i=1}^{n-1} a_i x_i^2$

2) Evaluate

$$\sum_{i=1}^{n} \frac{i^2 + 2}{n}$$

for $n = 10,\ 100,\ 1000$.

3) Use five rectangles to approximate the area of the region lying between the graph of $f(x) = x^2$ and the x-axis between $x = 0$ and $x = 1$ (draw a picture). Following example 3, find two approximations – one using left endpoints of subintervals and the other using right endpoints.

4) Use the limit process to find the area of the region bounded by the graph of $y = x^2 + 1$ and the x-axis on the interval $[0, 2]$.

Homework for this section: Read the section and watch the videos/tutorials. Then do these problems in preparation for the quiz: #3, 9, 17, 23, 29, 35, 39, 47, 61