CMSC 250 Homework 7 Spring 2006

Due Wed March 15 at the beginning of your discussion section.

1. Write the first four terms of the following sequences.

   (a) 2, 1, $\frac{4}{5}$, $\frac{5}{9}$

   (b) 0, -8, -162, -3072

2. Calculate the sum of the first three terms of each sequence from problem 1 both using a calculator and by hand using exact integer and fractional arithmetic.

   (a) $2 + 1 + \frac{4}{5} = 3\frac{4}{5}$ (by calculator: 3.8)

   (b) $0 + -8 + -162 = -170$

3. Write the product of the first three terms of the sequences from problem 1.

   (a) $2 * 1 * \frac{4}{5} = \frac{8}{5}$

   (b) $0 * -8 * -162 = 0$

4. For each of the following, change the following sums and/or products in expanded form to summation or product notation.

   (a)

$$\sum_{i=1}^{3} \frac{(-1)^i (i+1)}{3^i} 2^{4-i}$$

   (b)

$$\prod_{i=1}^{4} \frac{i^2 + 1}{x^i}$$

   (c)

$$\prod_{i=1}^{4} \left(\sum_{j=1}^{i} \frac{(-1)^{j+1}}{j} \right)^i$$