

PROBLEM SET NO. 1 (DUE ON MONDAY, OCTOBER 06 4:00 PM)

FRIDAY, 10/4

- **Apostol, Exercises I 4.7:** 10
- **Apostol, Exercises I 4.10:** 4 (Use problem 4 from above to inductively prove the *binomial theorem*.)
- **Problem 5: (recommended)** Recall from class that for $q \neq 1$ and all integers $n \geq 0$, one has

$$\sum_{k=0}^n q^k = \frac{1 - q^{n+1}}{1 - q} .$$

The right hand side of this relation is known as the *finite geometric series*. Give an alternative proof of above formula for the finite geometric series by deriving it using the expression

$$(1 - q) \cdot \sum_{k=0}^n q^k$$