Math 116 Problem Set #2 Due Wed., Sept. 12, 2018, in class.

In Apostol, Volume I, read Chapter 9, sections 1-7, pages 358-368; and Chapter 1, sections 8-20, pages 60-76.

1. From Apostol, Volume I, Section 9.6, page 365, do problems 1 (a,c), 3 (e,g), 6, 7.

2. From Apostol, Volume I, Section 9.10, page 371, do problems 1(f), 3, 4.

3. From Apostol, Volume I, Section 1.15, pages 70-72, do problems 1(b,f), 5(a).

4. a) Prove that for every complex number c and every positive integer n, there is a complex number z such that $z^n = c$. [Hint: If z has polar form (r, θ), what is the polar form of z^n?]

b) Explicitly find all complex numbers z such that $z^4 = -1$.

5. Define a function f on the closed interval $[0, 1]$ as follows: If $x = 1/n$ for some positive integer n, then $f(x) = 1$. Otherwise, $f(x) = 0$. Determine whether f is integrable on $[0, 1]$. If it is, evaluate the integral.

[Hint: The integral of a step function (with finitely many subintervals) doesn't depend on the values at the endpoints of the subintervals. What happens if for some n you take the partition of $[0, 1]$ given by the points $\{0, 1/n, 1/(n-1), 1/(n-2), \ldots, 1/3, 1/2, 1\}$? What happens as n varies?]