Math 116   Problem Set #10   Due Wed., Nov. 7, 2018, in class.

Reminder: Exam 2 will take place in class on Wednesday, Nov. 7, and will cover material on problem sets 5-10. Extra credit will be given to those who submit the sample exam in class on Monday, Nov. 5. During the exam, one two-sided handwritten 5"x 7" index card is permitted, but no other materials.

In Apostol, Volume II, read Chapter 8, Sections 10-16, pages 257-268.

1. From Apostol, Volume II, Chapter 8, Section 8.9, pages 255-256, do problems 10, 20.

2. From Apostol, Volume II, Chapter 8, Section 8.14, pages 262-263, do problems 1(a,b), 2(a), 3, 4, 11.

3. From Apostol, Volume II, Chapter 8, Section 8.17, pages 268-269, do problems 1, 2(a).

4.   a) Find the arclength of the plane curve given parametrically by $F(t) = (2t, \dfrac{t^3}{3} + \dfrac{1}{t})$, for $1 \le t \le 3$.
     b) Find the arclength of the plane curve whose graph is $y = \log \cos x$ for $0 \le x \le \pi/4$. (Here log is the natural logarithm.)

5. Define $f : \mathbb{R}^2 \to \mathbb{R}$ by $f(x, y) = x[y]$, where $[y]$ is the greatest integer in y.
     a) Determine whether f is continuous at the origin.
     b) Determine which partial derivatives exist at the origin, and evaluate each one that does.
     c) Determine which directional derivatives exist at the origin, and evaluate each one that does.
     d) Determine whether f is differentiable at the origin.