Note: This problem set is due on Wednesday, the day before Thanksgiving.
From Apostol, read Chapter 8, sections 8-18 and 23.

1. From Apostol, 8.14, pages 328-329, do problems 1, 5, 6, 9, 11, 12.
2. From Apostol, 8.17, pages 333-334, do problems 1, 2, 7, 11.
3. From Apostol, 8.19, page 339, do problems 1, 2.
4. a) Say a monetary quantity (e.g. an interest-bearing deposit, or the consumer price index) grows at a fixed rate of $r$ percent per year, compounded continuously. Let $C$ be the value at time $t=0$. Write an initial value problem that corresponds to this situation, and solve this problem, obtaining a formula for this function of $t$ in terms of $r$. Find the time $t_{0}$ that it takes for the quantity to double. What is the relationship between $t_{0}$ and $r$ ? Give this both in precise form and numerically (with the value of any constant given to within .01).
b) In the situation of (a), suppose that at the end of each year, the quantity is $i$ percent higher than at the beginning of that year. Find the relationship between $i$ and $r$. Also give a precise expression for $t_{0}$ in terms of $i$. If $t_{0}=k / i$, what is the numerical value of $k$ (to within .01) if $i=4$ ? 8? 16? How does $k$ vary with $i$ ? What is the limit of $k$ as $i \rightarrow 0$ ? as $i \rightarrow \infty$ ?
