1. (30 points) A proposed Math 116 stimulus package consists of the government giving $100 billion to individuals in the U.S. via a tax cut. We suppose that all those receiving a tax cut spend 80% of the money they get and save 20% of it. The 80% that they spend is then going to other people (shop owners, employees, etc.). These other people then spend 80% of what they receive and save 20%. This continues on indefinitely. Calculate the total additional spending created by this $100 billion tax cut.

   Total spending is $100(0.8)+100(0.8)^2+100(0.8)^3+100(0.8)^4+\cdots$.
   To compute total, We will examine the sum or the first *n* terms.
   $S_n = 100(0.8)+100(0.8)^2+100(0.8)^3+100(0.8)^4+\cdots+100(0.8)^n$
   So $(0.8)S_n = 100(0.8)^2+100(0.8)^3+100(0.8)^4+\cdots+100(0.8)^{n+1}$ and
   $S_n-(0.8)S_n = 100(0.8)-100(0.8)^{n+1}$ which, after some algebra, yields
   $S_n = \dfrac{100(0.8)-100(0.8)^{n+1}}{0.2}$. Take the limit as *n* goes to infinity, and $S_\infty = \dfrac{100(0.8)}{0.2} = 400$ billion dollars.