1. Demonstrate how to evaluate $L = \lim_{x\to\infty}\left(1+\frac{1}{x}\right)^x$.

2. Demonstrate how to build on the previous result (not method) to evaluate $K = \lim_{x\to\infty}\left(1+\frac{5}{x}\right)^x$.

3. If possible, we want to find the value of $\sqrt{1+\sqrt{1+\sqrt{1+\sqrt{1+\ldots}}}}$

   (a) Consider the recursive sequence $a_0 = 0$, $a_{n+1} = \sqrt{1+a_n}$. Compute the next five terms a_1, a_2, a_3, a_4, and a_5. (You can use a calculator.)

   (b) Were any of the values of a_k in the part (a) greater than 2?

   (c) Explain how you can tell that $a_n < 2$ for all n. (If you understand mathematical induction ...)

   (d) How do you know that $a_{n+1} > a_n$? (No formal proof is needed.)

   (e) Since $\{a_n\}$ is increasing and bounded above by 2, the Monotone Sequence Theorem says that $\{a_n\}$ converges. If $\lim_{n\to\infty} a_n = a$, show that $a = \sqrt{1+a}$.

   (f) What is the value of $\sqrt{1+\sqrt{1+\sqrt{1+\sqrt{1+\cdots}}}}$?