Worksheet #3 - Continuous Compounding

In this worksheet, you will examine continuously compounded interest – what happens as you compound interest more and more often.

1. If you deposit $1 in a bank account that earns 100% interest, compounded quarterly (4 times per year), how much money will be in the account after one year?

2. If you deposit $1 in a bank account that earns 100% interest, compounded monthly (12 times per year), how much money will be in the account after one year?

3. If you deposit $1 in a bank account that earns 100% interest, compounded daily (365 times per year), how much money will be in the account after one year?
4 If you deposit $1 in a bank account that earns 100% interest, compounded hourly, how much money will be in the account after one year?

5 If you deposit $1 in a bank account that earns 100% interest, compounded secondly, how much money will be in the account after one year?

6 Graph the function \((1 + \frac{1}{x})^x\) on your calculator, and try to determine from the graph the value of

\[
\lim_{x \to \infty} \left(1 + \frac{1}{x}\right)^x
\]

7 Explain what your answer to question 6 says about how much money you could expect to earn in the bank account problems described above by compounding more and more often.