Selftest Module 9:

The exponential function is its own derivative. Its value at 0 is 1. We can use this to approximately calculate the exponential because

$$\text{(1)} \qquad \exp(x+\delta) \approx \exp(x) + \delta \exp(x).$$

If you already had calculus, then you might want to read through the rest of the paragraph, but if not, you can just skip ahead to the Computer Science part. Since

$$\exp(x) = \exp'(x) \approx \frac{\exp(x+\delta) - \exp(x)}{\delta},$$

solving for $\exp(x+\delta)$ gives the equation (1).

Since $\exp(0) = 1$, we can find the value of $\exp(\delta)$ as $1 + \delta \times 1$. Using (1) another time, gives $\exp(\delta + \delta) = \exp(\delta) + \delta \exp(\delta)$. And so on. Now let's assume that we are given a value x for which we want to calculate the exponential. Assume that we want $n = 10000$ updates. So, we set $\delta = x/n$ and then 10000 times, we calculate $y = y + \delta y$, and this will give us an estimate for the exponential at x.

To do: Write a function euler(x) (named after the inventor of this method, L. Euler) that approximates the exponential at x using n updates.