Goal: Find exponential base e whos derivative is always equal to itself.

$$
\begin{aligned}
f(x) &= e^x \\
e^x &= \lim_{h \to 0} \frac{e^{x+h} - e^x}{h} = \lim_{h \to 0} \frac{e^x\left(e^h - 1\right)}{h} \\
he^x &= \lim_{h \to 0} e^x\left(e^h - 1\right) \\
h &= e^h - 1 \\
1 + h &= e^h ?
\end{aligned}
$$