

Exercise 1

- (a) How is the number e defined?
- (b) Use a calculator to estimate the values of the limits

$$\lim_{h \rightarrow 0} \frac{2.7^h - 1}{h} \quad \text{and} \quad \lim_{h \rightarrow 0} \frac{2.8^h - 1}{h}$$

correct to two decimal places. What can you conclude about the value of e ?

Solution

e is defined by

$$\lim_{h \rightarrow 0} \frac{e^h - 1}{h} = 1.$$

Evaluate the given limits.

$$\lim_{h \rightarrow 0} \frac{2.7^h - 1}{h} = 0.993252$$

$$\lim_{h \rightarrow 0} \frac{2.8^h - 1}{h} = 1.02962$$

The conclusion is that $2.7 < e < 2.8$.