

Exercise 23

Use a table of values to estimate the value of the limit. If you have a graphing device, use it to confirm your result graphically.

$$\lim_{x \rightarrow 4} \frac{\ln x - \ln 4}{x - 4}$$

Solution

Evaluate the given function at several values of x .

$$\left. \frac{\ln x - \ln 4}{x - 4} \right|_{x=3.9} = 0.253178$$

$$\left. \frac{\ln x - \ln 4}{x - 4} \right|_{x=3.99} = 0.250313$$

$$\left. \frac{\ln x - \ln 4}{x - 4} \right|_{x=3.999} = 0.250031$$

$$\left. \frac{\ln x - \ln 4}{x - 4} \right|_{x=4.001} = 0.249969$$

$$\left. \frac{\ln x - \ln 4}{x - 4} \right|_{x=4.01} = 0.249688$$

$$\left. \frac{\ln x - \ln 4}{x - 4} \right|_{x=4.1} = 0.246926$$

Therefore,

$$\lim_{x \rightarrow 4} \frac{\ln x - \ln 4}{x - 4} = 0.25 = \frac{1}{4}.$$

