

Exercise 41

Each limit represents the derivative of some function f at some number a . State such an f and a in each case.

$$\lim_{h \rightarrow 0} \frac{\cos(\pi + h) + 1}{h}$$

Solution

Recall that the derivative of $f(x)$ is defined by

$$f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}.$$

Comparing this to the given limit,

$$f(x) = \cos x,$$

and its derivative is being evaluated at $a = \pi$.