

Exercise 37

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

$$\lim_{h \rightarrow 0} \frac{\sqrt{9+h} - 3}{h}$$

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,

$$f(x) = \sqrt{x},$$

and its derivative is being evaluated at $a = 9$.