Exercise 39

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

$$\lim_{x \to 2} \frac{x^6 - 64}{x - 2}$$

Solution

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

$$f'(x) = \lim_{x \to a} \frac{f(x) - f(a)}{x - a}.$$

Comparing this to the given limit,

$$f(x) = x^6,$$

and its derivative is being evaluated at $a = 2$.