Exercise 5

For the following exercises, find the average rate of change of each function on the interval specified for real numbers b or h.

$$f(x) = 4x^2 - 7 \text{ on } [1, b]$$

Solution

The average rate of change of the function on $[1, b]$ is

$$\frac{f(b) - f(1)}{b - 1} = \frac{[4(b)^2 - 7] - [4(1)^2 - 7]}{b - 1}$$

$$= \frac{(4b^2 - 7) - (4 - 7)}{b - 1}$$

$$= \frac{(4b^2 - 7) - (-3)}{b - 1}$$

$$= \frac{4b^2 - 7 + 3}{b - 1}$$

$$= \frac{4b^2 - 4}{b - 1}$$

$$= \frac{4(b^2 - 1)}{b - 1}$$

$$= \frac{4(b + 1)(b - 1)}{b - 1}$$

$$= 4(b + 1).$$