Exercise 29

Find the critical numbers of the function.

$$f(x) = 4 + \frac{1}{3}x - \frac{1}{2}x^2$$

Solution

A critical number is a value of x for which the derivative is zero or nonexistent. Take the derivative of this function.

$$\begin{aligned} f'(x) &= \frac{d}{dx}\left(4 + \frac{1}{3}x - \frac{1}{2}x^2\right) \\ &= 4(0) + \frac{1}{3}(1) - \frac{1}{2}(2x) \\ &= \frac{1}{3} - x \end{aligned}$$

Set $f'(x) = 0$ and solve for x.

$$\begin{aligned} f'(x) &= 0 \\ \frac{1}{3} - x &= 0 \\ x &= \frac{1}{3} \end{aligned}$$