

Exercise 37

Find the critical numbers of the function.

$$h(t) = t^{3/4} - 2t^{1/4}$$

Solution

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

$$\begin{aligned} h'(t) &= \frac{d}{dt}(t^{3/4} - 2t^{1/4}) \\ &= \frac{3}{4}t^{-1/4} - 2\left(\frac{1}{4}\right)t^{-3/4} \\ &= \frac{3}{4t^{1/4}} - \frac{1}{2t^{3/4}} \\ &= \frac{3}{4t^{1/4}} \times \frac{t^{1/2}}{t^{1/2}} - \frac{1}{2t^{3/4}} \times \frac{2}{2} \\ &= \frac{3t^{1/2}}{4t^{3/4}} - \frac{2}{4t^{3/4}} \\ &= \frac{3t^{1/2} - 2}{4t^{3/4}} \end{aligned}$$

Set what's in the numerator and denominator equal to zero and solve for t .

$$3t^{1/2} - 2 = 0 \qquad 4t^{3/4} = 0$$

$$t^{1/2} = \frac{2}{3} \qquad t^{3/4} = 0$$

$$t = \frac{4}{9} \qquad t = 0$$