

## Exercise 34

Find the critical numbers of the function.

$$g(t) = |3t - 4|$$

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### Solution

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

$$\begin{aligned}g'(t) &= \frac{d}{dt}|3t - 4| \\&= \frac{d}{dt}\sqrt{(3t - 4)^2} \\&= \frac{1}{2}[(3t - 4)^2]^{-1/2} \cdot \frac{d}{dt}(3t - 4)^2 \\&= \frac{1}{2}[(3t - 4)^2]^{-1/2} \cdot 2(3t - 4)^1 \cdot \frac{d}{dt}(3t - 4) \\&= \frac{1}{2}[(3t - 4)^2]^{-1/2} \cdot 2(3t - 4) \cdot (3) \\&= \frac{6(3t - 4)}{2\sqrt{(3t - 4)^2}} \\&= \frac{3(3t - 4)}{|3t - 4|} \\&= 3 \operatorname{sgn}(3t - 4)\end{aligned}$$

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

$$|3t - 4| = 0$$

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$$t = \frac{4}{3}$$