

Question

Given: $f(x) = 3x^3 + 3x^2 - 3x$.

The domain of this function is the set of all real numbers. And we have the derivate of the function:

$$f'(x) = 9x^2 + 6x - 3.$$

Critical points:

$$f'(x) = 9x^2 + 6x - 3 = 0 \Rightarrow$$
$$\Rightarrow x = \frac{-6 \pm \sqrt{36 + 108}}{18} = \frac{-6 \pm 12}{18} = -1, \frac{1}{3}.$$

$$f(-1) = -3 + 3 + 3 = 3$$

$$f\left(\frac{1}{3}\right) = \frac{1}{9} + \frac{1}{3} - 1 = -\frac{5}{9}$$

So, the critical numbers are:

1) -1 ;

2) $\frac{1}{3}$.

Answer: the critical numbers are: -1 ; $\frac{1}{3}$.