

1. Find the derivative

$$f(x) = \sec\left(\frac{x}{2}\right) \tan\left(\frac{x}{2}\right)$$

2. Find the $\frac{dy}{dx}$ by implicit differentiation

$$x^4y - 8xy + 3xy^2 = 9$$

3. Find the absolute extrema of the function on the closed interval

$$f(x) = \frac{x}{x+3}, [-1, 6]$$

- 4.

$$f(x) = 5 - |x - 5|$$

- (a) Find the critical numbers of f
- (b) Find the open intervals on which the function is increasing or decreasing
- (c) Apply the First Derivative Test to identify all relative extrema