

1. Find the derivative

$$f(x) = 5 \cos^2(\pi x)$$

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

$$x^3 y^3 - y = x$$

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

$$f(x) = 3x^{\frac{2}{3}} - 2x, [-1, 1]$$

- 4.

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

- (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