Problem 1 (15 points)

Consider the following function:

\[ f(x) = x^3 - 3x^2 + 1. \]

a) Compute the first derivative \( f'(x) \).

b) Find the critical numbers.

c) Draw the sign and variation tables of \( f' \) and \( f \).

d) Find all local or absolute maxima or minima of \( f \).

e) Study the concavity of \( f \).