1. [4pts] Find $y'$ if $y = \frac{e^{1-x}}{x^2 - 1}$. For which value(s) of $x$ is $y' = 0$?

2. [4pts] Let $x^2 - xy + 2y^2 = 4$. Use implicit differentiation to find in the simplest possible form

(a) $\frac{dy}{dx}$
(b) $\frac{d^2y}{dx^2}$. 
3. [4pts] Find $y'$ if $y = (x^2 + 1)^{x^2-1}$.

4. [4pts] Use differentials to approximate $\sqrt{29}$. 
5. [4pts] A manufacturer finds that the total cost \( c \) of producing \( q \) units of a product is given by \( c = 0.02q^2 + 2q + 800 \). For which value(s) of \( q \) will the average cost be a minimum?

6. [4pts] Use the second derivative test to find all value(s) of \( x \) for which \( f(x) = \frac{x^3}{3} - \frac{5x^2}{2} + 4x - 1100 \) has (a) a relative minimum (b) a relative maximum.
7. [6pts] Let \( f(x) = \frac{x^2}{x - 4} \).
(a) Determine the intervals on which \( f \) is increasing or decreasing.
(b) Find the points where \( f \) has a relative maximum or a relative minimum.
(c) Find the absolute extrema of \( f \) on the closed interval \([-2, 2]\).