1. (48 points, 6 points each part) Find the derivative of each of the following. You need not simplify your answers. Circle each answer.

(a) \( y = (x^2 - 1)(3x^3 - 6x + 5) - 4(4x^2 + 2x + 1) \)

(b) \( f(x) = \frac{x + 2}{x - 1} \)
(c) \[ g(x) = \sqrt[3]{8x^2 - 1} \]

(d) \[ y = \ln \sqrt[2]{\frac{1 + x^2}{1 - x^2}} \]

(e) \[ h(x) = x^3 \ln(2x + 5) \]
(f) \( y = x^5 + 5^x \)

(g) \( y = x^2 e^{-x^2} \)

(h) \( y = x^{2x+1} \)
2. (11 points) Find $dy/dx$ by implicit differentiation if $2x^3 + y^3 - 12xy = 0$.

3. (11 points) Use the chain rule to find $dy/dx$ if $y = u^2 - 2u$ and $u = x^2 - x$. 

4. (10 points) Use logarithmic differentiation to find $y'$ if $y = \sqrt{x+1}\sqrt{x^2-2}-\sqrt{x+4}$.

5. (10 points) If $y = e^{-4x^2}$ then find $y''$. 

(over, please)
6. (10 points) For a firm, the daily output on the \( t \)th day of a production run is given by

\[
q = 500(1 - e^{-0.2t})
\]

Find the rate of change of output \( q \) with respect to \( t \) on the tenth day.