HOMEWORK #6
Graphing and Optimization

Complete your work on separate pages.

1. Use the First Derivative Test and appropriate limits to classify the critical values of each function as non-extrema or local/global max/min.
   (a) \( g(x) = \frac{x^2}{\sqrt{x^2 - 1}} \)
   (b) \( y = 3x^5 - 20x^3 + 32 \)

2. If possible, use the Second Derivative Test and appropriate limits to classify the critical values of each function as non-extrema or local/global max/min.
   (a) \( y = 3x^5 - 20x^3 + 32 \)
   (b) \( f(x) = -e^{x^2 + 4x - 12} \)
   (c) \( s = t^4 \)

3. Use Fermat’s Theorem to find the global minimum and global maximum for each.
   (a) \( y = 3x^5 - 20x^3 + 32 \) on \([-1,3]\)
   (b) \( f(x) = -e^{x^2 + 4x - 12} \) on \([-1,3]\)

4. Make a careful sketch of the graph of
   (a) \( y = x^3 - x + 60 \)
   (b) \( y = \frac{3x^2}{x^2 - 4} \)