Name: _____ _____ / **20**

There are 20 points possible on this quiz. No aids (book, calculator, etc.) are permitted. Show all work for full credit.

1. [4 points] Consider the function $f(x) = \sqrt[3]{4-x}$. Determine all critical points (critical numbers) for $f(x)$.

2. [6 points] Find the absolute maximum and minimum values of the function

$$f(x) = 2x^3 + 3x^2 - 12x + 7$$

on the interval $[0,2]$ and the x-values where they occur. Show your work.

Absolute Maximum: $y =$ _____ occuring at $x =$_____.

Absolute Minimum: $y =$ _____ occuring at $x =$_____.

3. [4 points] Consider the function $g(t) = t^2 \ln(t)$.

a. What is the domain of $g(t)$?

b. Determine all critical numbers (a.k.a. critical points) of $g(t)$.

4. [6 points] Suppose h is continuous on $[-3,3]$ and has a derivative at each point in $(-3,3)$, and furthermore, suppose that $h(-3) = 1$ and $h(3) = -3$.

a. What specifically does the Mean Value Theorem let you conclude?

b. If in addition, you know that h has a local maximum at $x = -1$, draw a diagram that illustrates the Mean Value Theorem for this problem. Your illustration should include a tangent line somewhere.