Name:_____

Test 2
Summer 2007
MTH121 Section 01
July 10, 2007

Directions : You have 60 minutes to complete all 5 problems on this exam. There are a possible 100 points to be earned. You may not use your book, notes, or any graphing/programmable calculator. Please be sure to show all pertinent work. *A correct answer with no work will receive very little credit!* If any portion of the exam is unclear please come to me and I will elaborate provided I can do so without giving away the problem.

1. (20 points)
The **wandering zombie** is the curve given by the equation

$$y^4 - 2y^3 - x^3 - y^2 + 3x^2 + 2y - 2x = 0.$$

Use implicit differentiation to find the slope of the line tangent to the wandering zombie at the point $(1, 2)$.

2. (20 points)
A particle moves along the curve $y = \sqrt{1 + x^3}$. As it reaches the point $(2, 3)$, the y-coordinate is increasing at a rate of 4 cm/s. How fast is the x-coordinate of the point changing at that instant?

3. (20 points)
Use a linear approximation to estimate $\sqrt{170}$.

4. (20 points)
Find the maximum and minimum value of the function on the indicated interval.

$$f(x) = \frac{x^2 - 4}{x^2 + 4},\ [-4, 4].$$

5. (20 points)
Show that the equation $x^3 - 15x + 7 = 0$ has exactly one root in the interval $[-2, 2]$.