Name:\_\_\_\_\_

#### **Test 4** Fall 2008 MATH 111 Section 01 April 21, 2008

**Directions :** You have 50 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. An incorrect answer with no work will receive no 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.

Solve the equation.

$$\log_2 (x+2) = \log_5 (25) - \log_2 (x-4) + 7^{\log_7 (2)}$$

2. (20 points) Given that  $\log_a (x) = 1$ ,  $\log_a (y) = -2$ ,  $\log_a (z) = -2$ , and  $\log_a (w) = 3$ , evaluate

$$\log_a\left(\frac{x^3w}{y^2z^4}\right)$$

Suppose a wheel of radius 2 inches is rotating at a rate of 30 revolutions per minute. Find the angular speed of the wheel as well as the linear speed.

Find the exact value of the six trigonometric functions for the acute angle  $\theta$  given that  $\cot(\theta) = \frac{7}{24}$ .

Verify the identity by transforming the left-hand side into the right-hand side.

$$\frac{1+\cos^2\left(3\theta\right)}{\sin^2\left(3\theta\right)} = 2\csc^2\left(3\theta\right) - 1.$$