Name_____

MA 112
Final Exam
May 3, 2004

This exam contains 8 problems. You will have 120 minutes to take the exam. Please ask if you find any problem unclear.

Show all your work and circle the final answers.

Problem	#1	#2	#3	#4	#5	#6	#7	#8	TOTAL
Possible	10	15	15	20	20	25	25	20	150
Points									

#**1**. Find the slope-intercept equation of the straight line passing through the point $(1, -1)$ and parallel to the line $y = 2x + 7$.

#**2**. Sketch the graph of $f(x) = 3 + 2^{x+1}$. Clearly mark the asymptote(s) and intercept(s).

#3. Express in terms of sums and differences of logarithms and simplify as much as possible. (Assume that $a, b, c > 1$)

$$\log_a \sqrt{\frac{a^3 b^4}{c^5}} =$$

#4. Solve the system of linear equations. Show your work.

$$\begin{aligned} x - \ \ y + 2z &= -3 \\ x + 2y + 3z &= \ \ 4 \\ 2x + \ \ y + \ \ z &= -3 \end{aligned}$$

#**5**. For the function $f(x) = -2x^2 + 4x + 1$

(a) find the zeros,
(b) find the vertex,
(c) find the line of symmetry
(d) find the intervals where $f(x)$ increases or decreases.

#6. Solve the inequality and write the solution using the interval notation. Show your work.

(*a*) $(x+2)(x-1) > 0$

(*b*) $\dfrac{3}{x^2-4} \geq \dfrac{1}{x+2}$

#**7**. For each of the given rational functions find all asymptotes (vertical, horizontal, oblique).

$$(a) \quad f(x) = \frac{5x^2 - x + 1}{x^2 - 9} \qquad (b) \quad f(x) = \frac{x^2 - 4}{x - 1}$$

#**8**. Suppose you deposited \$1000 into a savings account with the interest rate 5%.

(a) If the interest is compounded annually, find the formula $A(t)$ for the amount of money in the account after t years.

(b) If the interest is compounded continuously, find the formula $A(t)$ for the amount of money in the account after t years.

(c) If the interest is compounded continuously, after how many years you will have \$2000 in this account? (Express your answer using logarithm(s), do not evaluate.)