

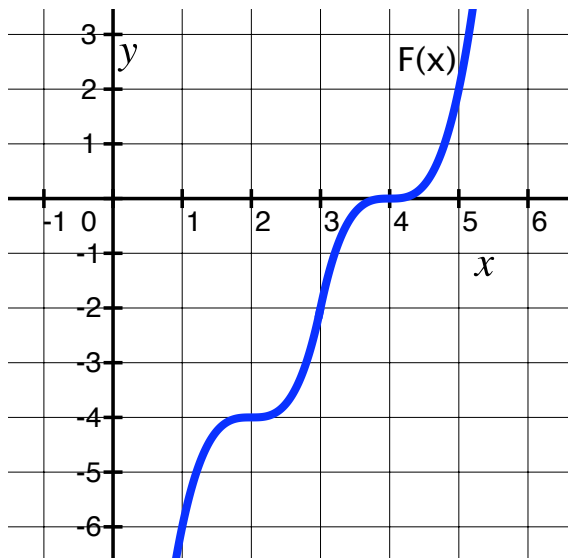
Math 111
Final Exam
June 2010

Name: _____

1. Your exam contains 10 questions and 7 pages; Please make sure you have a complete exam.
2. The entire exam is worth 100 points. Point values vary and these are indicated on each problem. You have 2 hours for this exam.
3. Make sure to ALWAYS SHOW YOUR WORK; you will not receive any partial credit unless all work is clearly shown. If in doubt, ask for clarification.
4. Put a box around your final answer where applicable.
5. Leave answers in exact form (as simplified as possible) or round to 4 decimal places.
6. You are allowed one 4" \times 6" notecard for handwritten notes (both sides).
7. You may use a calculator for this exam, but I will not give credit for work done solely on a calculator (aside from arithmetic).
8. If you need extra space, use the back of the exam and clearly indicate this.

Problem	Total Points	Score
1	9	
2	9	
3	16	
4	14	
5	15	
6	7	
7	8	
8	9	
9	8	
10	5	
Total	100	

1. (9 pts.) Use the following graph of the function $F(x)$ for parts (a), (b), and (c) below.



(a) (3 pts.) For what x -values is $F(x) > 0$?

(b) (3 pts.) Approximate $F^{-1}(1)$.

(c) (3 pts.) Find the average rate of change of $F(x)$ between $x = 2$ and $x = 4$.

2. (9 pts.) Find an equation of a **line** parallel to $2x + 4y = 12$ with an x -intercept at $x = 8$.

3. (16 pts.) Consider the quadratic function $f(x) = x^2 + 4$ for the following parts (a), (b), and (c).

(a) (3 pts.) Give the domain of $f(x)$.

(b) (3 pts.) Find the vertex of $f(x)$.

(c) (6 pts.) Describe the transformations that are needed to transform $f(x)$ into $4f(x - 1)$.
Given these transformations, what is the vertex of $4f(x - 1)$?

(d) (4 pts.) Give the **formula** for $4f(x - 1)$. **Simplify** as much as possible.

4. (14 pts.) Consider the function $h(x) = \frac{2x^3 - 6x^2 - 8x}{x - 3}$.

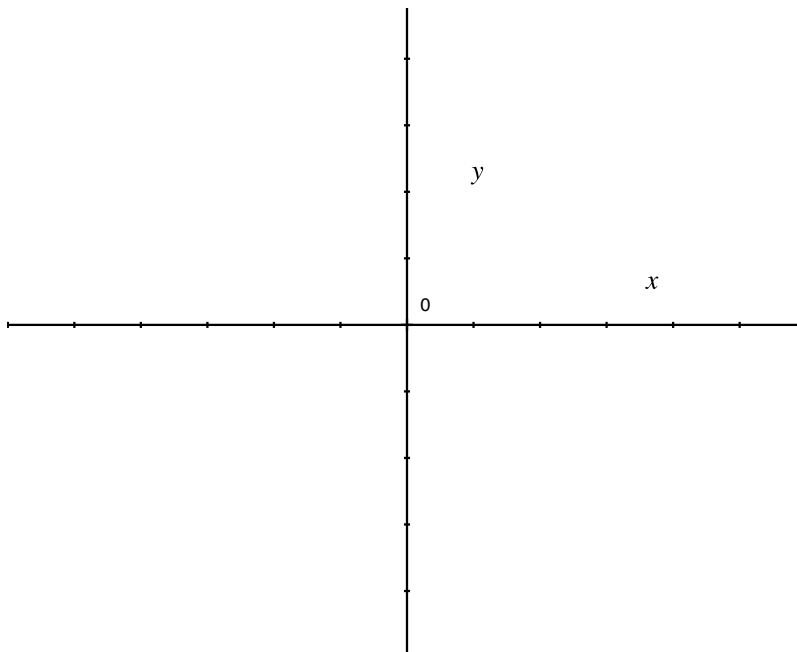
(a) (4 pts.) Give the domain of $h(x)$.

(b) (7 pts.) Find the zeros of $h(x)$ (if any).

(c) (3 pts.) Does $h(x)$ have any horizontal asymptotes? Does $h(x)$ have any vertical asymptotes?
If so, write the equations of the asymptotes.

5. (15 pts.) Consider the piecewise-defined function $g(x) = \begin{cases} -2x - 2 & \text{if } x \leq 0 \\ 2^x & \text{if } x > 0 \end{cases}$.

(a) (8 pts.) Sketch $g(x)$ on the set of axes below. Put a scale on your axes.



(b) (2 pts.) What is the range of $g(x)$?

(c) (5 pts.) Find $g(0) + 2g(1)$.

6. (7 pts.) Find all of the **points** on the graph of $H(x) = 4x^{1/5} + 9$ with a y -coordinate of 1.

7. (8 pts.) Suppose you have an account that gives 7% interest **compounded quarterly**.

(a) (6 pts.) If you invest **once** by depositing \$3,000 today, how much will be in your account after 6 years?

(b) (2 pts.) Find the effective rate of the account. (Approximate to 4 decimal places.)

8. (9 pts.) Suppose you borrow a certain amount of money at a **continuously compounded** annual rate of 30%. How long would it take for your debt to **triple**? (Give the exact and approximate answer and include units.)

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9. (8 pts.) You want to start saving for a down payment for a house, so you start saving \$300 each month in an account that gives 3% compounded monthly. How much will you have after 4 years?

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10. (5 pts.) Consider $y = f(x) = \frac{5}{x^3}$. Find the inverse function $x = f^{-1}(y)$.