Math 111
Exam 2
May 22nd, 2009

Name: _____

1. Your exam contains 8 questions and 5 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 50 minutes 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. If you need extra space, use the back of the exam and clearly indicate this.
5. You are allowed one 3" $\times$ 5" notecard (both sides). Graphing and scientific calculators are allowed.
6. Leave answers in exact form as **simplified as possible** unless otherwise specified.

Problem	Total Points	Score
1	25	
2	7	
3	11	
4	10	
5	10	
6	15	
7	8	
8	14	
Total	100	

1. (25 pts.) Suppose you have a bank account that gives interest with a balance in dollars at year t given by

$$B(t) = 2500(1.04)^t.$$

(a) (4 pts.) How much did you invest initially into the account?

(b) (4 pts.) By what percentage rate is the account growing each year?

(c) (8 pts.) After 10 years, what is the balance of your account?

(d) (9 pts.) When will the account have a balance of \$10,000? (Give the exact answer and the decimal approximation.)

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2. (7 pts.) Solve the following equation: $\log_x 216 = 3$

3. (11 pts.) What is the **half-life** of a particular type of Polonium if it **decays** 21.26% each year? (Include units.)

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4. (10 pts.) Consider the function $g(x) = \ln(2x + 8)$.

   (a) (5 pts.) What is the domain of $g(x) = ?$

   (b) (5 pts.) Decompose the function $g(x) = \ln(2x + 8)$ into two functions $u(x)$ and $v(x)$ such that

   $$u(v(x)) = g(x). \qquad \text{(with } u(x) \neq x \text{ and } v(x) \neq x\text{)}$$

5. (10 pts.) The height of a ball (in feet) thrown on the surface of the moon is given by $H(t) = -2.67t^2 + 40t$.

What is the maximum height that the ball obtains? (Include units.)

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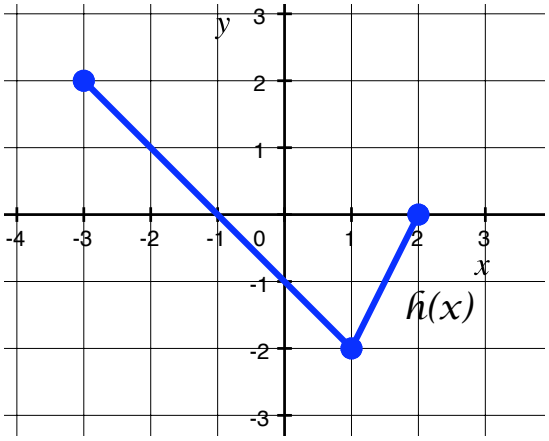
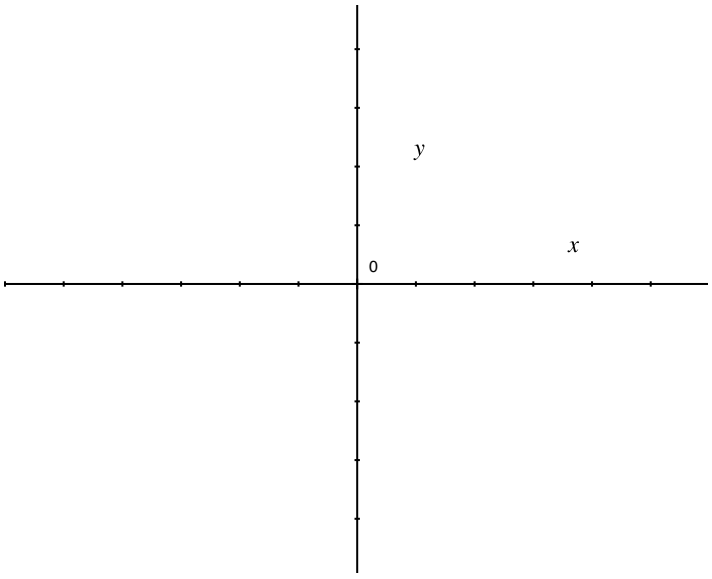
6. (15 pts.) The following is a graph of $h(x)$.



(a) (6 pts.) What is the domain of $2h(\frac{1}{3}x)$?

(b) (9 pts.) Sketch the graph of $-\frac{1}{2}h(x-3)+1$ on the set of axes below. Put a **scale** on your axes.



7. (8 pts.) For the function $f(x) = x^2 + 1$, simplify the following as much as possible: $\dfrac{f(x+h)-f(x)}{h}$

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8. (14 pts.) The graphs of $g(x)$ and $y = 20 - x$ are shown below.

   Find the equation of $g(x)$ given that it is **exponential**.