

Math 111
Exam 2
May 20th, 2010

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. 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 3" \times 5" 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	20	
2	8	
3	12	
4	9	
5	7	
6	12	
7	12	
8	20	
Total	100	

1. (20 pts.) The population of the town Exponentville at year t is given by $P(t) = 50,000(0.97)^t$.
- (a) (4 pts.) What is the initial population?
- (b) (6 pts.) By what percentage is the population changing each year?
Is the population increasing or decreasing?
- (c) (10 pts.) When will the population be equal to 40,000 people? Include units. (Give the exact answer and the decimal approximation.)

2. (8 pts.) Solve $\log_5(3x + 2) = 3$.

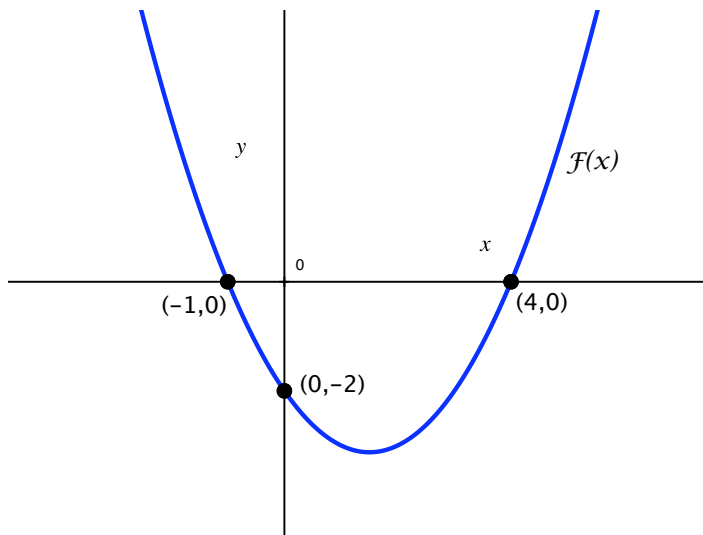
3. (12 pts.) Find the **doubling time** for a savings account that increases by 5% each year. Include units in your answer. (i.e., How long would it take for a certain amount in this account to become twice as large?)

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4. (9 pts.) Write an equation of an **exponential** function that goes through the points $(0, 8)$ and $(-1, 20)$.

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5. (7 pts.) Decompose the function $g(x) = e^{2+x^3}$ into two functions $u(x)$ and $v(x)$ such that $u(v(x)) = g(x)$.

(with $u(x) \neq x$ and $v(x) \neq x$)

6. (12 pts.) The graph of the function $F(x)$ below is a parabola. Find an **equation** of the function.

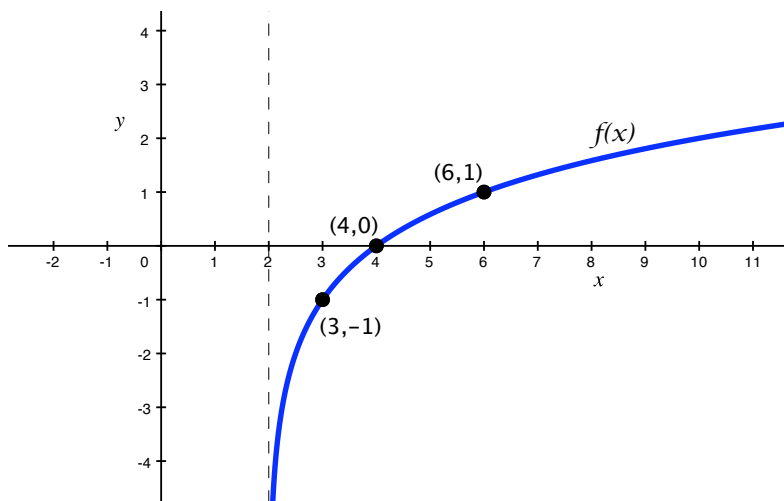


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7. (12 pts.) $h(x) = -3x^2 + 24x + 1$

(a) (8 pts.) Find the vertex of $h(x)$.

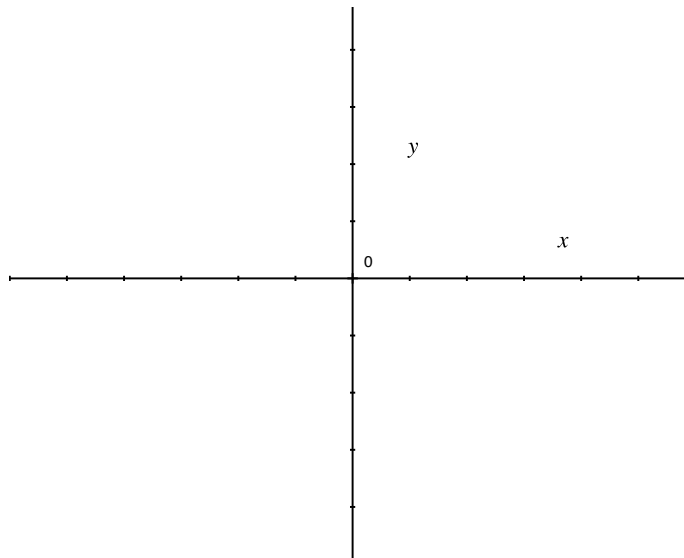
(b) (4 pts.) Give the range of $h(x)$.

8. (20 pts.) The following is a graph of $f(x)$. Use it to answer parts (a), (b), and (c). Note: $f(x)$ has the asymptote $x = 2$.



- (a) (4 pts.) What is the domain of $f(x)$?

- (b) (9 pts.) Sketch $2f(x+3)$ on the axis below. Clearly **label the points** of your graph and put a scale.



- (c) (7 pts.) What is the domain of the function $f(-2x) - 1$?