

**Math 111**  
**Exam 3**  
**November 30th, 2007**

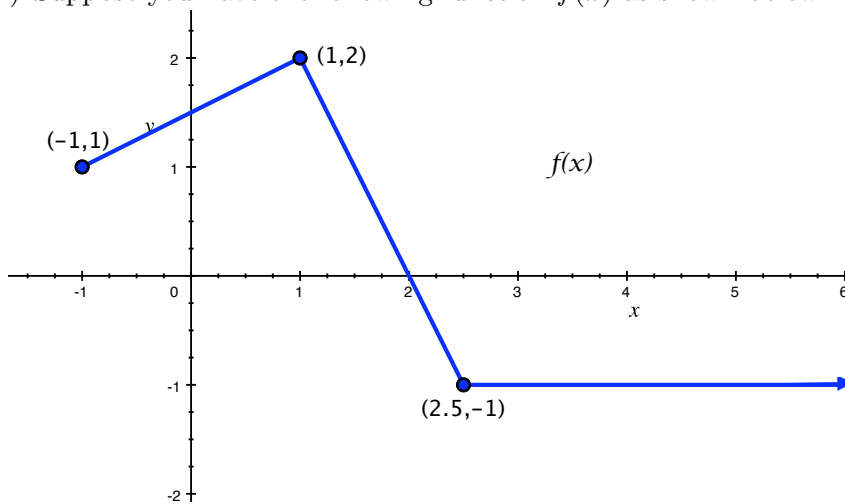
Name: \_\_\_\_\_

1. Your exam contains 6 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 full 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  $8.5 \times 11$  sheet of handwritten notes (both sides). Graphing and scientific calculators are allowed.
6. Leave answers in exact form (as simplified as possible) or round to 4 decimal places. Monetary values can be rounded to 2 decimal places.

Problem	Total Points	Score
1	14	
2	28	
3	22	
4	10	
5	13	
6	13	
Total	100	

1. (14 pts.) Find an equation for the function  $f(x)$  whose graph is a parabola that goes through the origin with vertex  $(-2, 3)$ .

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2. (28 pts.) Suppose you have the following function  $f(x)$  as shown below.

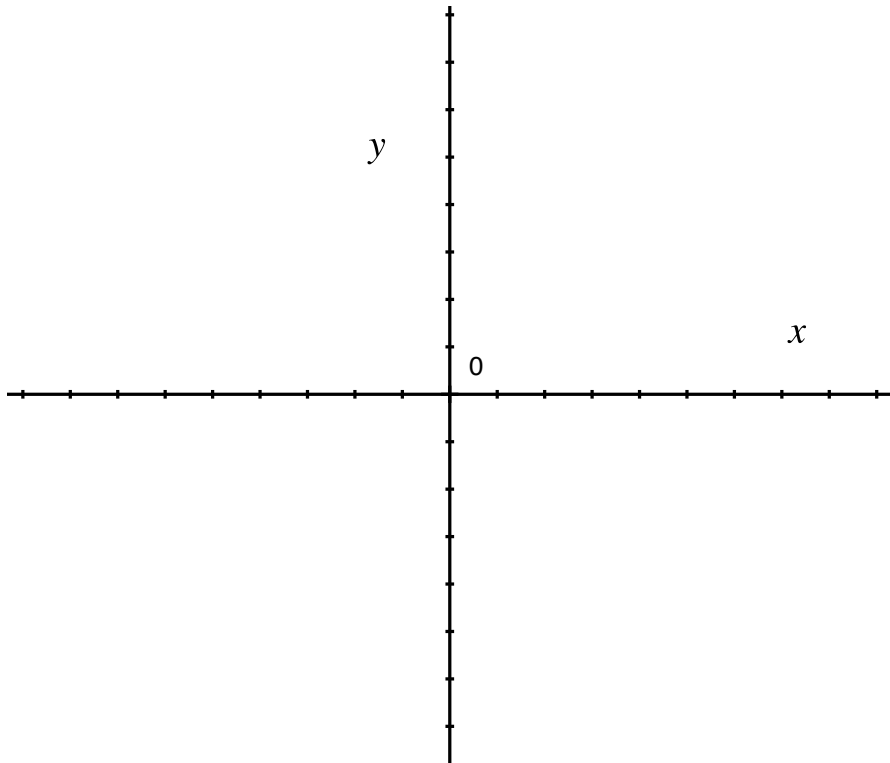


- (a) (8 pts.) What is the domain of  $f(-\frac{1}{2}x)$ ?

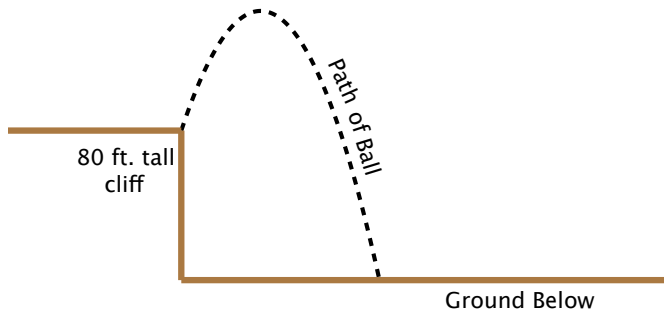
# 2 Continued:

(b) (8 pts.) What is the range of  $f(x) + 2$ ?

(c) (12 pts.) Sketch the graph of  $3f(x + 1)$  below. Clearly label the points on your graph.



3. (22 pts.) Ernie kicks a soccer ball up into the air with an initial velocity of 64 feet/second from the edge of a 80 foot cliff. The height of the ball above the ground below is given by  $h = -16t^2 + 64t + 80$  in feet at  $t$  seconds.



(a) (10 pts.) When does the ball land?

(b) (12 pts.) When does the ball reach its maximum height? What is the maximum height?

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4. (10 pts.) Decompose the function  $g(x) = \frac{1}{\sqrt{2x+5}}$  into two functions  $u(x)$  and  $v(x)$  such that  $u(v(x)) = g(x)$  (with  $u(x) \neq x$  and  $v(x) \neq x$ ).

5. (13 pts.) You decide to buy a \$22,000 hybrid vehicle today. You make a down payment of \$5000 and get a 5-year loan for the rest of the balance with a 8.4% annual rate compounded monthly. How much do you have to pay monthly for the loan?

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6. (13 pts.) Suppose you want to retire in 40 years with 1 million dollars. You have a retirement account with an 8.4% annual rate compounded quarterly. How much would you have to invest every 3 months to reach your goal?