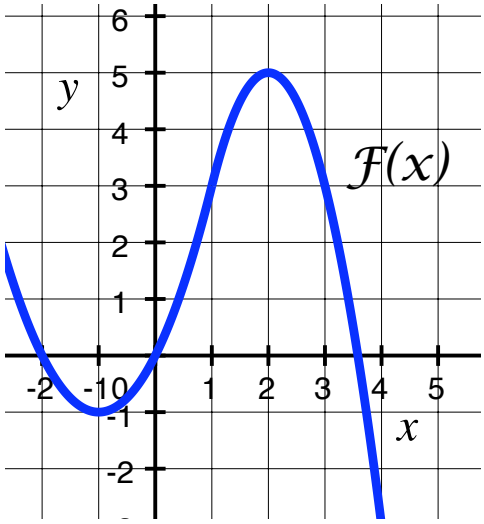
Math 111
Exam 1
April 22nd, 2011

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 any partial credit unless all work is clearly shown. If in doubt, ask for clarification.
4. You may use a calculator (not a cell phone calculator application!), but I will not give credit for work done solely on a calculator (aside from arithmetic).
5. Leave answers in exact form (as simplified as possible).
6. Put a $\boxed{\text{box around your final answer}}$ where applicable.
7. If you need extra space, attach a sheet to the back of the exam and clearly indicate this.
8. Be sure to **check your answers!**
9. In case you need it, here is the quadratic formula: $x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

Problem	Total Points	Score
1	17	
2	20	
3	10	
4	14	
5	15	
6	24	
Total	100	

1. (17 pts.) For parts (a)-(d) below, the function $F(x)$ is given in the graph below.



(a) (3 pts.) Find $F(1)$.

(b) (5 pts.) For what approximate x-value(s) is $F(x) = 0$?

(c) (6 pts.) Find the average rate of change of $F(x)$ from $x = -1$ to $x = 2$.

(d) (3 pts.) Estimate the interval(s) for which $F(x)$ is concave down.

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2. (20 pts.) Consider the functions $f(x) = \dfrac{1}{x-2}$ and $g(x) = 5x - 1$.

(a) (8 pts.) Give the domain of $f(x)$ and the domain of $g(x)$.

#2 Continued on the next page $\rightarrow$

#2 Continued:

(b) (5 pts.) Find $g(f(9))$. Simplify as much as possible.

(c) (7 pts.) Find $f(g(x))$. Simplify as much as possible.

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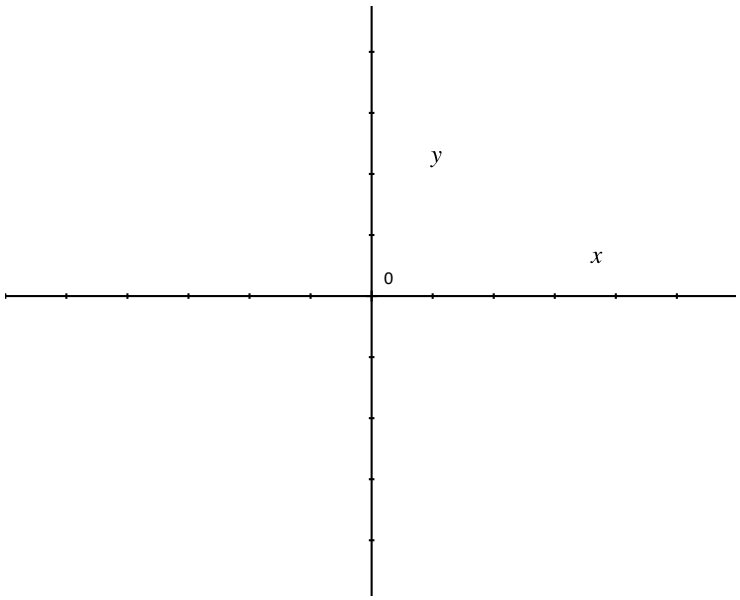
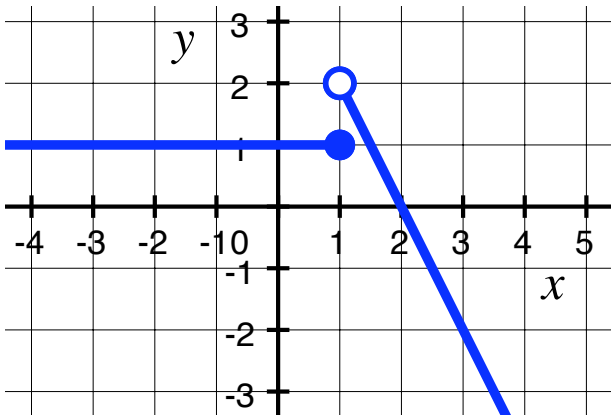
3. (10 pts.) Graph the function $g(x) = 4 - x^2$ on the axes below and then give the domain and range of $g(x)$. (Be sure to put a scale on your axes.)



4. (14 pts.) Write the formula for the following function using piecewise notation.



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5. (15 pts.) A ball is kicked into the air at time 0. The height (in feet) of a ball at t seconds is given by $h(t) = -16t^2 + 48t$.

   (a) (5 pts.) How high is the cannonball at 1 second? (Give units.)

   (b) (10 pts.) When will the ball be 20 feet high? (Give units.)

6. (24 pts.) Suppose the velocity (in meters/seconds) of a squirrel at time t seconds is given by

$$v = f(t) = 7t^3 + 2.$$

(a) (7 pts.) Find $f(1)$ and interpret it in terms of time and velocity.

(b) (9 pts.) Find a formula for the inverse function $t = f^{-1}(v)$.

(c) (8 pts.) Find $f^{-1}(58)$ and interpret it in terms of time and velocity.