

BRONX COMMUNITY COLLEGE  
of the City University of New York

DEPARTMENT OF MATHEMATICS AND COMPUTER SCIENCE

MATH 30  
Nikos Apostolakis

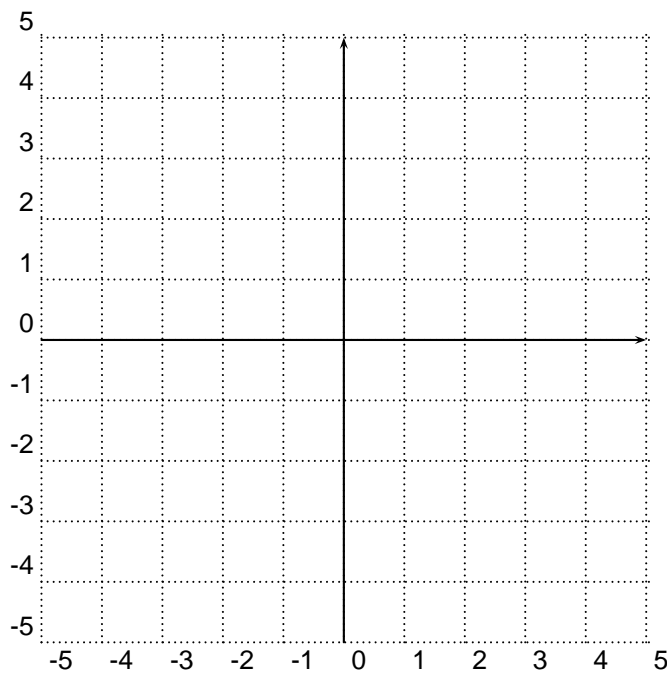
Exam 2  
October 11, 2007

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

**Directions:** You *must* show all your work in the provided space. Simplify your answers whenever possible. Be certain to indicate your final answer clearly. The perfect score for this exam is 1000 points.

1. (125 points) Graph the following function. Possible  $x$  or  $y$  intercepts should be identified exactly.

$$f(x) = \begin{cases} x^2 + 2x - 3 & \text{if } x \leq 1 \\ 2x - 1 & \text{if } x > 1 \end{cases}$$



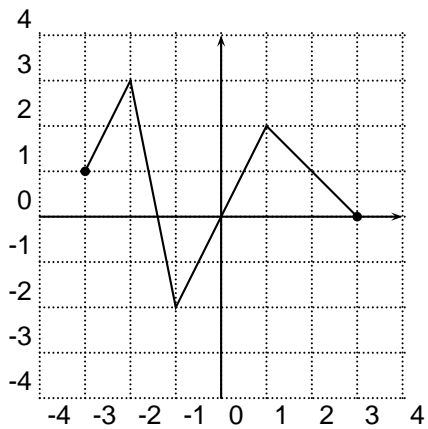
2. (125 points) Find the domain, the range, and the inverse function of the following function:

$$f(x) = \frac{2}{x+3}$$

Your answers should be in interval notation.

3. (125 points) Verify that the following two functions are inverses of each other:  $f(x) = \frac{2x - 5}{x + 3}$   
and  $g(x) = \frac{3x + 5}{2 - x}$ .

4. (125 points) Find the domain and the range of the function  $h$  whose graph is shown:



5. (125 points) Solve the inequality:  $(x + 2)(x - 1)(x - 3) \geq 0$

6. (125 points) Let  $f(x) = \sqrt{3x - 6}$  and  $g(x) = 2x + 1$ . Find the domain and the formula for the function  $\frac{f}{g}$ .

7. (125 points) Suppose a ball is thrown directly upward from an initial height of 200 feet with an initial velocity of 96 feet per second. Then the height of the ball (in feet) after  $t$  seconds is given by the equation:

$$h(t) = -16t^2 + 96t + 200$$

When will the ball reach its maximum height?

8. (125 points) The graph of the function  $g$  is obtained by shifting the graph of the function  $f(x) = 2x^3$  three units to the right along the  $x$ -axis and four units downwards along the  $y$ -axis. Find a formula for  $g(x)$ . (**You don't need to graph  $g$** ).