BRONX COMMUNITY COLLEGE
of the City University of New York

DEPARTMENT OF MATHEMATICS AND COMPUTER SCIENCE

MATH 30 | Midterm
Nikos Apostolakis | March 25, 2010

Name: _____

Directions: Write your answers in the provided space. To get full credit you *must* show all your work. Simplify your answers whenever possible. Be certain to indicate your final answer clearly. This exam has a total of 100 points.

1. Find the domain for each of the following functions:

   (a) (10 points) $f(x) = \dfrac{2x-1}{x^2-x-12}$

   (b) (10 points) $g(x) = \sqrt{x^2-4}$

   (c) (10 points) $h(x) = \log_2(9-x^2)$

2. (10 points) Find $f \circ g$, where $f(x) = \dfrac{2x-3}{5x+2}$ and $g(x) = \dfrac{x-1}{x+2}$

3. (10 points) Let $f(x) = x^2 - 4x - 2$ with domain $[-\infty, 2)$, and $g(x) = 2 - \sqrt{x+6}$. Prove that f and g are a pair of inverse functions.

4. (10 points) Find the formula, the domain and the range of f^{-1}, where

$$f(x) = \frac{-x+3}{4x-7}$$

5. (5 points) List all possible rational roots of the following polynomial, according to the "Rational Root Theorem".

$$p(x) = 6x^5 - 3x^4 + 7x^3 - 2x^2 + 8x - 12$$

6. (15 points) Solve the following equation:

$$x^5 - 5x^4 - x^3 + 11x^2 - 6 = 0$$

7. (20 points) Solve the following inequality:

$$x^4 - 4x^3 + 3x^2 + 4x - 4 \geq 0$$