Name: _____

GSI: _____

Section Time: _____

MATH 32 FALL 2012

MIDTERM 1

Start time: 8:10am

End time: 9am

No books, notes, calculators, or electronic devices allowed.

Please show your work and provide explanations where appropriate. If you need more space, you may use the backs of the pages or extra paper, but make a note that you did so.

Problem	Score	Out of
1		6
2		12
3		12
4		18
5		6
6		6
Total:		60

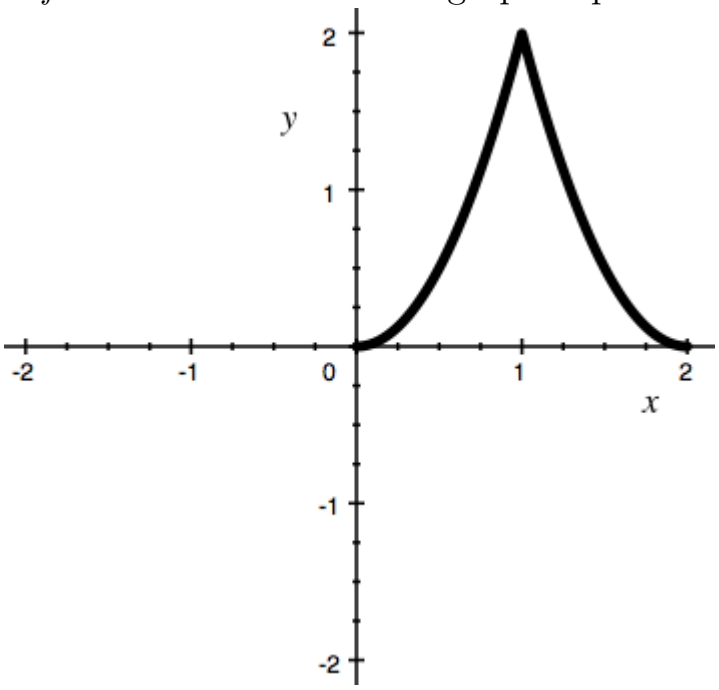
MATH 32 FALL 2012 MIDTERM 1

(1) (6 points) Find all values of x satisfying the inequality

$$\frac{x+2}{x-1} < 2$$

(2) (12 points) Let $f(x) = x^2 - 4x + 6$. The graph of f is a parabola. Find an equation for the line containing the vertex of this parabola and its y-intercept. For partial credit, make sure to clearly write down the vertex and y-intercept once you have found them.

(3) Let f be the function whose graph is pictured below:



(a) (6 points) Inferring from the picture, what are the domain and range of f?

(b) (6 points) Sketch a graph of the function

$$g(x) = f\left(\frac{x}{2}\right) - 2.$$

Be sure to clearly label your axes.

(4) Let $f(x) = \sqrt{x-1}$ and $g(x) = x^3 - x^2 - 2x + 1$.

(a) (6 points) What is the domain of the composition $g \circ f$?

(b) (6 points) Find a formula for the composition $(f \circ g)(x)$.

(c) (6 points) What is the domain of $f \circ g$?

(5) (6 points) Write $(2x^2)^{-2} - 2(x^2)^{-2}$ as a single fraction.

(6) (6 points) Give an example of a polynomial of degree 5 which has zeros 0, 2, and 4, and no other zeros. You may write the answer in factored form.