MA 100 MIDTERM

Write your name on your bluebook. Please show your work and give justifications for your answers. You may use your calculator and one side of an 8 1/2 by 11 sheet of notes on the midterm. You may not use a cell phone or computer. Try not to spend too much time on any single problem; if you get stuck on a problem leave a partial answer and move on to the next. If you have time left over at the end of the exam please use it to check your work.

(1) (5 pts) For what values of x is it true that $|x - 1| < 4$?

(2) a) (5 pts) Simplify: $\dfrac{x^2 + 3x + 2}{x^2 - 1}$

b) (5 pts) Simplify: $\dfrac{6}{a + h} - \dfrac{6}{a}$

(3) (10 pts) Solve for x: $x^2 - 4x - 1 = 0$.

(4) A rectangle is twice as long as it its wide. The area of the rectangle is 50 square inches.
a) (10 pts) Draw a diagram or write an equation describing this situation.
b) (10 pts) Find the width of the rectangle.

(5) (20 pts) The graph of a function $f(x)$ is shown on the left below.
a) What is $f(0)$?
b) For what values of x does $f(x) = 2$?
c) For what values of x is $f(x) > 2$?
d) For what values of x is $f(x)$ decreasing?

(6) (10 pts) The graph of function $g(x)$ is shown on the right above. Guess the equation of $g(x)$.

(7) (10 pts) A line passes through the points $(-1, 4)$ and $(2, 2)$.
a) Find the slope of the line.
b) Find the slope of a line perpendicular to the first line.

(8) (10 pts) The following table is taken from page 72 of the text. Does this table describe weight as a function of height? Why or why not?

Height	72 in.	60 in.	60 in.	63 in.	70 in.
Weight	180 lb	204 lb	120 lb	145 lb	184 lb

Bonus (5 pts) Sketch the graph of the equation $x^2 + (y + 2)^2 = 4$.