MA 100 SAMPLE FINAL

Please write your name, your ID number and the color of your exam paper on your blue book!

Please try to show your work and give justifications for your answers. It is permitted to use calculators, graph paper, rulers, both sides of an 8 1/2 x 11 sheet of notes and a magnifying glass on the final. 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.

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

(2) (5 pts) Compute: $(3 - 5i)(4 + 2i)$

(3) (5 pts) For what values of x is $|x - 5| > 2$?

(4) (5 pts) Sketch the graph of $f(x) = |x + 2|$. Label your sketch.

(5) (5 pts) Give the equation of the line that passes through the points $(2, 1)$ and $(8, 3)$.

(6) (10 pts) Find all zeros (real and complex) of the polynomial $2x^4 + 2x^2 = 0$.

(7) (5 pts) Check your solutions to the problem above in the original equation.

(8) (10 pts) Describe the graph of the equation $(x - 1)^2 + y^2 = 1$. (A labeled sketch of the graph counts as a description.)

(9) (10 pts) Let $f(x) = e^{2x}$. What is $f^{-1}(x)$?

(10) (10 pts) If $f(x) = x^2 - 1$ and $g(x) = x + 1$, what is $f(g(x))$?

(11) (10 pts) Compare the distance between the points (x_1, y_1) and (x_2, y_2) to the sum $|x_2 - x_1| + |y_2 - y_1|$. When is the distance greater than the sum? Equal to the sum? Less than the sum?

(12) (10 pts) Sketch the graph of $f(x) = \frac{x^2 + x - 7}{x^2 - 1}$. Label your sketch.

(13) (10 pts) Given the graph of a function but not its formula (e.g. one of the eight graphs shown on page 130), estimate the solutions of the equation $f(x) = 2$.