Exam II Review Sheet  
MATH 121A, Fall 2003

This exam will cover sections 2.4-3.2 in your text. You should know general terms and definitions from each of these sections, review the homework and quizzes given for these sections, and pay particular attention to the subjects and practice problems mentioned below.

1. Solving absolute value equations and inequalities.
2. Complex arithmetic and simplifying square roots of negative numbers.
3. Solving quadratic equations by factoring, completing the square and/or using the quadratic formula.
4. Solving quadratic and rational inequalities.
5. Plotting points on the coordinate plane and finding the distance between them.
6. Graphing equations and identifying $x$- and $y$-intercepts and the different types of symmetry.
7. Graphing circles and finding the equations of circles.
8. Graphing lines and finding the equations of lines.

Below is a list of sample problems. This list is not all-inclusive, but does represent the types of problems you will see on the exam.

1. Simplify or solve, expressing your answer in interval notation when appropriate.
   (a) $|\frac{2x-1}{x+1}| = 3$  
   (b) $|3x - 2| = 2x + 1$  
   (c) $|x - 5| \leq 5$  
   (d) $|4x - 12| > 24$

2. Simplify the following.
   (a) $(2 + 3i) + (4 - 7i)$  
   (b) $(2 + \sqrt{-4})(4 - 3\sqrt{-9})$  
   (c) $\frac{2+5i}{3+i}$  
   (d) $\frac{1+2i}{3}$

3. Solve each of the following quadratic equations using any method (you should use each of: factoring, completing the square, and the quadratic formula at least once).
   (a) $8x^2 - 64 = 0$  
   (b) $w^2 = 4w - 3$  
   (c) $x^2 - 6x - 9 = 0$  
   (d) $x^4 - 3x^2 = 4$  
   (e) $\sqrt{5 - x} = x + 1$

4. Solve each of the following inequalities, expressing your answer in interval notation
   (a) $\frac{x^2}{x+1} \geq 0$  
   (b) $\frac{x}{x+1} < 3x$  
   (c) $\frac{x^2-4x+3}{x-5} \leq 0$

5. Given points $A(2,5)$, $B(6,-7)$ and $C(2,-2)$, complete the following.
   (a) Plot all points on a graph.
   (b) Find the distance between each set of points.
   (c) Find the equation of the circle with endpoints of a diameter $A$ and $C$ (Hint: Midpoint formula).

6. Graph each of the following equations, find their $x$ and $y$ intercepts, and test for symmetry.
   (a) $4y = x^2$  
   (b) $y = |4 - x|$  
   (c) $y = x^3 - 4x$
7. Write the letter(s) of the figures above which answer each question.

Which are symmetric about the x-axis?
Which are symmetric about the y-axis?
Which are symmetric about the origin?
Which have none of the three symmetries?
Which represent the graphs of functions?
Which have both x and y intercepts?

8. Find the equation for the lines described below in standard form and graph them.
   (a) With slope \( \frac{2}{3} \) through point (3, -1)
   (b) Through points (3, 1) and (0, -2)
   (c) \( \frac{1}{2}x - \frac{1}{3}y + 1 = 0 \)
   (d) Through (-1, 1) perpendicular to \( 2x - 3y + 2 = 0 \)

9. Find the center and radius of the following circles, and graph them.
   (a) \( x^2 + y^2 = 4 \)
   (b) \( (x - 3)^2 + (y + 2)^2 = 9 \)
   (c) \( x^2 + 4x + y^2 - 10y = 7 \)