Name ______________________ Rec. Instr. ______________

Rec. Time ______________

COLLEGE ALGEBRA

Exam II
October 10, 2006

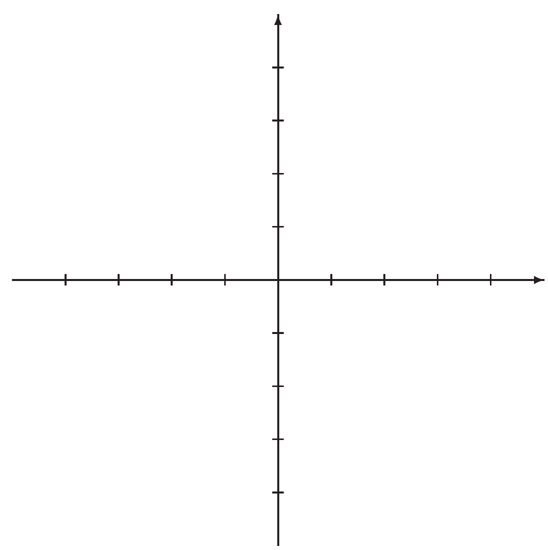
Page 1 (16 pts.)	**Page 2** (32 pts.)	**Page 3** (24 pts.)	**Page 4** (28 pts.)	**TOTAL** (100 pts.)

Below you will find 11 problems, with their maximum scores. Solve the problems in the space provided. When writing a solution to a problem, **show all work**. No books or notes are allowed.

Problem 1 (8 points). The equation $x^2 + 8x + y^2 - 6y + 21 = 0$ represents a **circle**. Find the center and the radius of this circle.

Problem 2 (8 points). Consider the line equation: $2x - 3y = -6$.

(a) Find the slope, the x-intercept, and the y-intercept.



(b) Using the information from **(a)**, sketch the graph in the figure above. (Tickmarks are at distance 1 unit apart on both axes.)

Problem 3 (16 points). Let $f(x) = x^3 - 3x + 5$.

(a) Sketch the graph of $f(x)$ in the box on the right, using the calculator `WINDOW` settings: `Xmin=-5, Xmax=5, Xscl=1, Ymin=-5, Ymax=10, Yscl=2, Xres=1`.

(b) Find the x-intercept(s). (**Round to three decimal places**.)

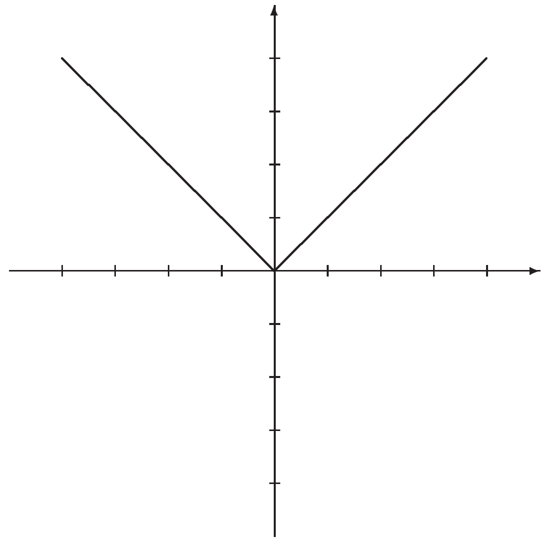
(c) Find the relative maximum and minimum points. (**Round to three decimal places**.)

(d) Specify the intervals where the function is increasing, decreasing, or constant.

Problem 4 (8 points). Consider the functions $f(x) = \dfrac{1}{1-x}$ and $g(x) = \dfrac{2}{x}$. Find the function $(f \circ g)(x)$ and its domain.

Problem 5 (8 points). Simplify $\dfrac{10+5i}{1+2i}$, as $a + bi$ (with a, b real numbers)

Problem 6 (8 points). The graph of $f(x) = |x|$ is shown in the figure on the right. (Tickmarks are at distance 1 unit apart on both axes.) Consider the new function $h(x) = -f(x + 2)$.



(a) Specify the transformations that are needed for obtaining the graph of $h(x)$ from the graph of $f(x)$

(b) Using the information from **(a)**, sketch the graph of $h(x)$ in the **same** figure above.

Problem 7 (8 points). Determine if the function $f(x) = \dfrac{x}{x^2 + 1}$ is even, odd, or neither even nor odd.

Problem 8 (8 points). Find **all** (**real and complex!**) solutions of the equation

$$x^4 - 3x^2 - 4 = 0.$$

(HINT: Use the substitution $z = x^2$.)

Problem 9 (12 points). Let $\mathcal{L}$ be the line given by the equation $y - 2x = 3$.

(a) Find the equation of the line passing through $(-1, 2)$, which is **parallel** to $\mathcal{L}$.

(b) Find the equation of the line passing through $(-1, 2)$, which is **perpendicular** to $\mathcal{L}$.

Problem 10 (8 points). The amount of \$2000 is invested in two acounts: (a) *Savings*, paying 3% simple interest, and (b) *Money Market*, paying 5% simple interest. After 1 year the total accumulated interest was \$82. How much was invested in each account?

Problem 11 (8 points). Two numbers M and N are such that M is 10 less than N, and their product is 299. Find M and N. (List all possibilities.)