MATH 222 QUIZ 6 (TAKE HOME) DUE MARCH 5, 2007

NAME:

Complete the given problems. Show all work. You may use your textbook and notes. It is due at the **beginning** of class on Monday, March 5.

Problem 1

(a) **(1 point).** Use the discriminant test to decide whether the equation $-2x^2 - xy + y^2 + 7x - 8y + 15 = 0$ represents an ellipse, a parabola, or a hyperbola.

(b) **(2 points).** Show that the graph of $-2x^2 - xy + y^2 + 7x - 8y + 15 = 0$ is actually the two lines $y = 2x + 3$ and $y = -x + 5$.

Problem 2 (2 points). Evaluate the following integral.

$$\int_0^{\pi} \sqrt{1 - \cos x}\, dx$$

Problem 3 (2 points). Determine whether the following improper integral converges or diverges.

$$\int_1^\infty \frac{\cos^2 x \, dx}{x^2 + 1}$$

Hint: You only need to show whether or not the integral converges. Do not attempt to actually compute it.

Problem 4

(a) **(1 point).** Sketch a graph of

$$r = \sin(2\theta)$$

(b) **(2 points).** Find the equation of the tangent line to $r = \sin(2\theta)$ at $\theta = \frac{\pi}{4}$