İzmir University of Economics, Department of Mathematics

Матн 205	Analytic Geometry	Exam 1	13.12.2004
Name		Student No.	E-mail

You will not get any points if your answer is wrong, that is no points to your explanations if your answer is wrong. And of course no points to a correct answer if your explanation or proof is not correct or clear.

YOU must write GOOD Mathematics

- 1. Given the conic equation $13x^2 + 10xy + 13y^2 = 72;$
 - (a) Rotate the xy-coordinate system counterclockwise through an appropriate angle to obtain the conic equation in the standard form.
 - (b) Find the vertices, foci, directrices and eccentricity of the conic in the xy-coordinate system.

SOLUTION:

$2. \ {\rm Given \ the \ hyperbola}$

$$\frac{(y-y_0)^2}{b^2} - \frac{(x-x_0)^2}{a^2} = \alpha^2, \quad \alpha \neq 0;$$

Find the vertices, foci, asymptotes, directrices and eccentricity of the conic in the xy-coordinate system. SOLUTION:

- 3. (a) Use focus-directrix formula to find the equation of conic whose directrix is the line x + y 1 = 0and one of the focus is (3,3) and whose eccentricity is $e = \sqrt{2}$.
 - (b) Find the equation(s) of symmetry.

SOLUTION:

4. A one parameter (α) family of Folium of Descartes is given by the parametric equation

$$x = \frac{3\alpha t}{1+t^3}, \qquad y = \frac{3\alpha t^2}{1+t^3}, \quad t \in \mathbb{R}$$

- (a) Find the cartesian equation F(x, y) = 0 of the curve
- (b) Let $\alpha = 1$. Find the equation of the tangent line at t = 1.

SOLUTION: