İzmir University of Economics, Department of Mathematics

MATH 205 ANALYTIC GEOMETRY   **Quiz 2**   31.10.2005

Name   **Student No.**

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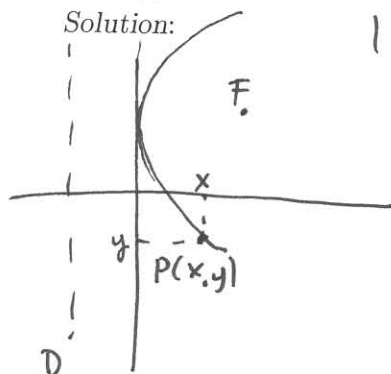
You will not get any points if your answer is wrong, that is no points to your explanations if your answer is wrong. And of course no points to a correct answer if your explanation or proof is not correct or clear.

YOU *must write GOOD Mathematics*

1. Use geometric definition to find the equation of the parabola with focus $F = (2,2)$ and directrix $x = -2$.

Solution:

$|PF| = |PD|$ Let $P(x,y)$ be an arbitrary point on the parabola.

Then $\sqrt{(x-2)^2 + (y-2)^2} = x + 2$.

Squaring both sides gives

$x^2 - 4x + 4 + y^2 - 4y + 4 = x^2 + 4x + 4$

which simplifies to

$$x = \frac{1}{8}(y^2 - 4y + 8)$$

2. Find the foci, vertices and center focus distance of the conic

$$x^2 + 4y^2 - 2x - 8y + 1 = 0.$$

Solution: Completing to perfect squares gives

$(x-1)^2 - 1 + 4(y-1)^2 - 4 + 1 = 0$ or

$$\frac{(x-1)^2}{4} + \frac{(y-1)^2}{1} = 1$$

an ellipse whose center is $(1,1)$ has

semimajor axis $a = 2$

seminor axis $b = 1$ and $c = \sqrt{2^2 - 1} = \sqrt{3}$ center focus distance.

Thus vertices are $(1 \mp 2, 1)$, foci $(1 \mp \sqrt{3}, 1)$.