2014–15 **MAT233 Matematik III – Ödev 3** N. Course

SON TESLİM TARİHİ: Çarşamba 29 Ekim 2014 saat 10:00'e kadar.

Egzersiz 7 (Polar Coordinates)**.**

(a) [6 × 5p] Find the Cartesian coordinates (x, y) of the following points (given in polar coordinates):

(i) $(r, \theta) = (\sqrt{2}, \frac{\pi}{4})$
(ii) $(r, \theta) = (1, 0)$
(iii) $(r, \theta) = (0, \frac{\pi}{2})$
(iv) $(r, \theta) = (-\sqrt{2}, \frac{\pi}{4})$
(v) $(r, \theta) = (-3, \frac{5\pi}{6})$
(vi) $(r, \theta) = (5, \tan^{-1} \frac{4}{3})$

Egzersiz 8 (Graphing in Polar Coordinates)**.**

(a) [10p] Identify the symmetries of the curve $r = 1 + 2\sin\theta$.

(b) [60p] Graph the curve $r = 1 + 2\sin\theta$.
[NOTE: There are 60 points for this question - take your time and draw a clear graph please.]

Ödev 2'nin çözümleri

4. Since $a = 70$ and $e = 0.1$, we have that $c = ae = 7$ and $b^2 = a^2 - e^2 = 4900 - 49 = 4851$. Therefore $\frac{x^2}{4851} + \frac{y^2}{4900} = 1$. The conic section is an ellipse ($e < 1$).

5. Since $\cot 2\alpha = \frac{A-C}{B} = \frac{1-1}{1} = 0$, we have that $2\alpha = \frac{\pi}{2}$ or $\alpha = \frac{\pi}{4}$. Therefore $x = x'\cos\alpha - y'\sin\alpha = \frac{x'-y'}{\sqrt{2}}$ and $y = x'\sin\alpha + y'\cos\alpha = \frac{x'+y'}{\sqrt{2}}$. So $1 = x^2 + xy + y^2 = \left(\frac{x'-y'}{\sqrt{2}}\right)^2 + \left(\frac{x'-y'}{\sqrt{2}}\right)\left(\frac{x'+y'}{\sqrt{2}}\right) + \left(\frac{x'+y'}{\sqrt{2}}\right)^2 = \frac{3}{2}x'^2 + \frac{1}{2}y'^2$. Therefore the curve is an ellipse. Sketch omitted.

6. (a) $B^2 - 4AC = -11$. Ellipse. (b) $B^2 - 4AC = 0$. Parabola.