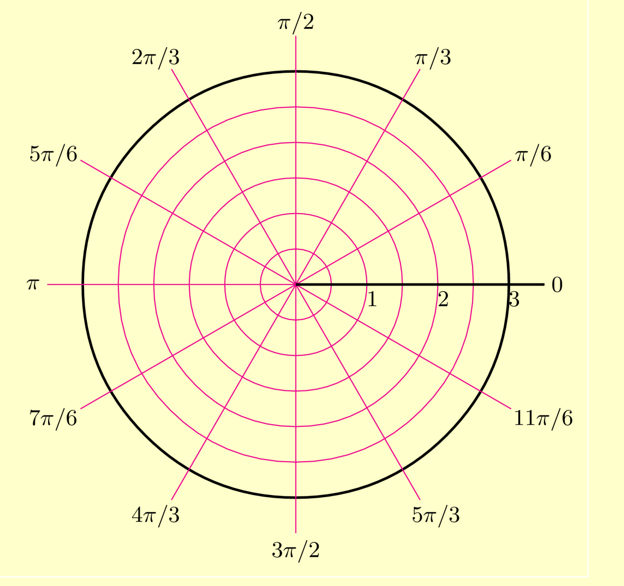
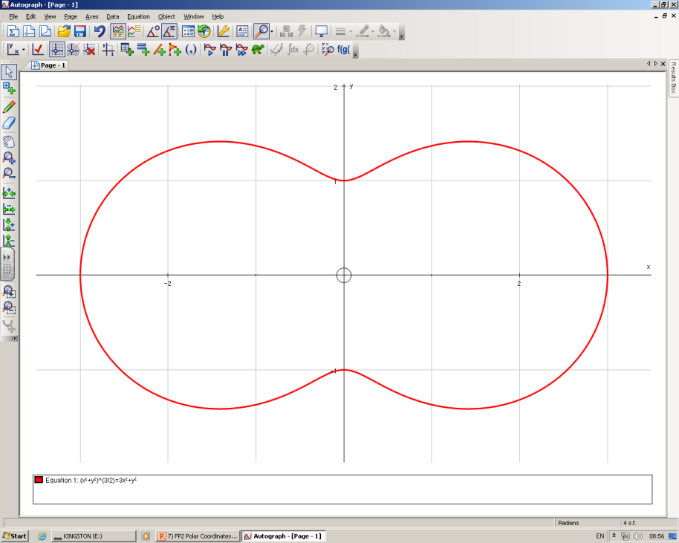
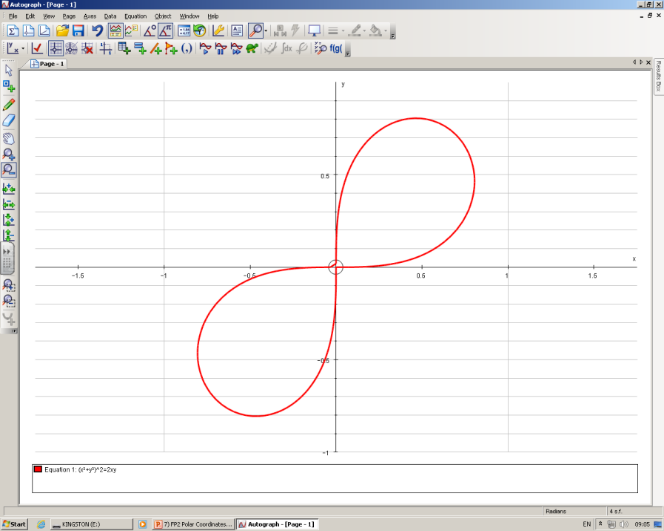
**5A Polar Coordinates and Equations**

Cartesian Polar



1. Find the Polar coordinates of the following point:
2. (5,9)
3. (5, -12)
4. Convert the following Polar coordinate into Cartesian form.
5. Find a Cartesian equation of the following curve:
6. ,



1. Find a Polar equivalent for the following Cartesian equation:

**5B Polar Graphs**

1. Sketch the Polar equation:



















In General

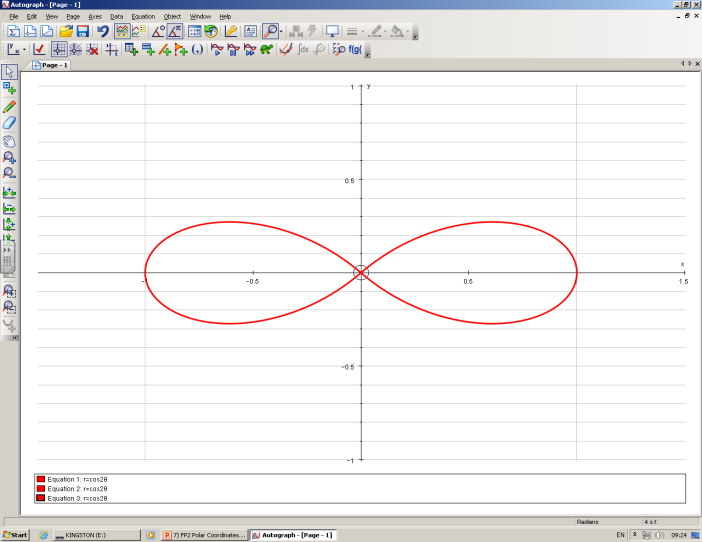
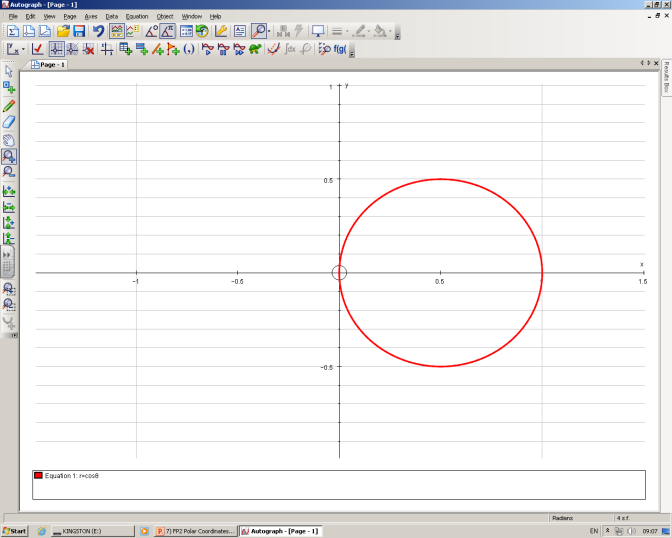
**p < q q ≤ p < 2q**

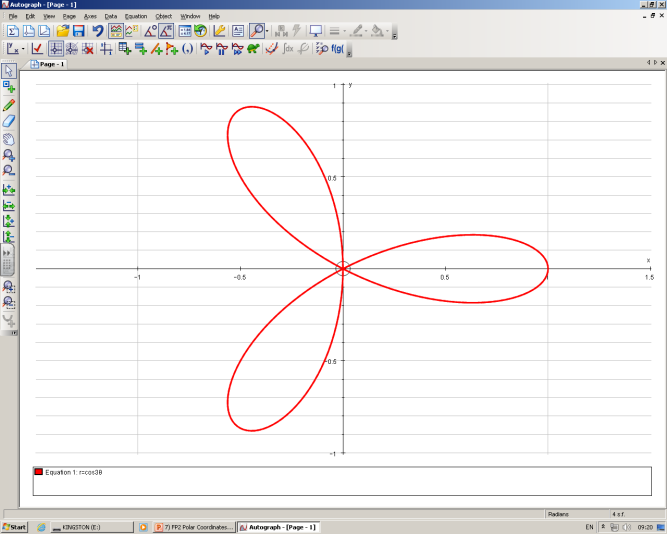
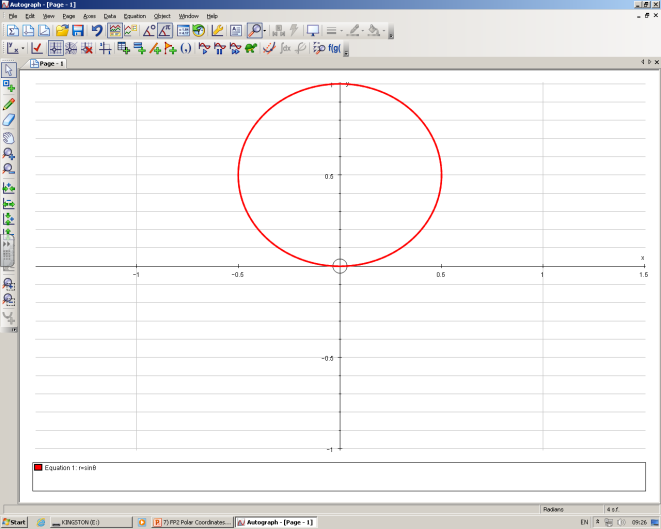
 

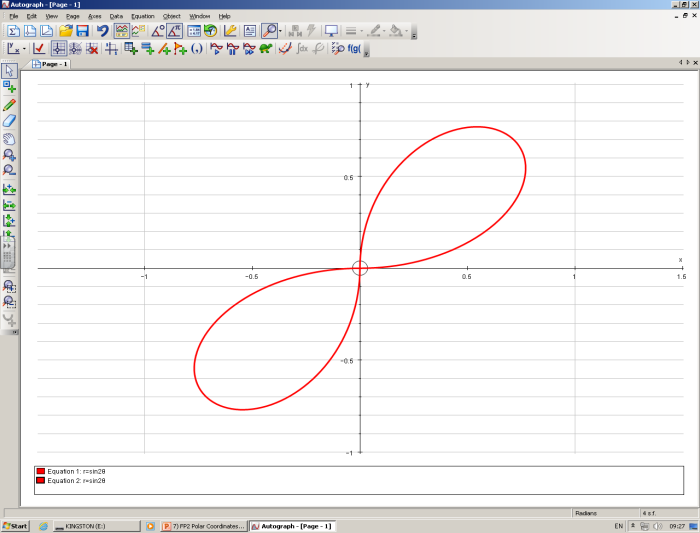
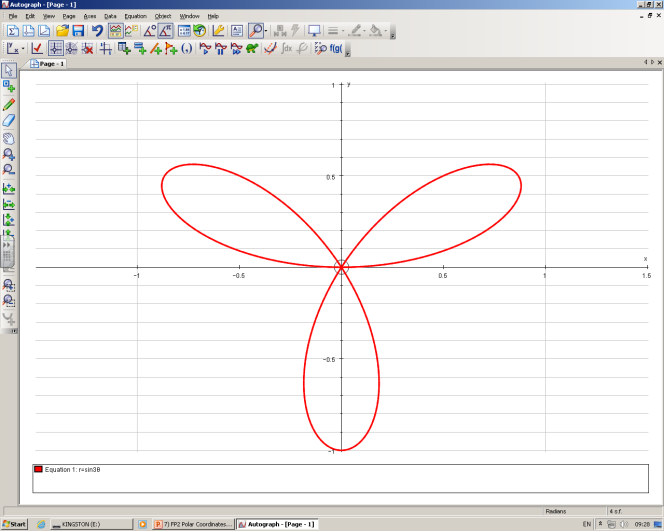
**p = q p ≥ 2q**

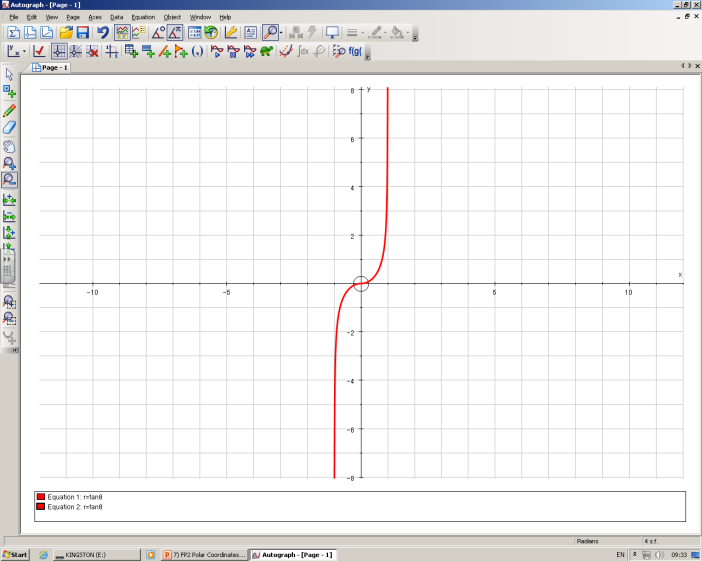
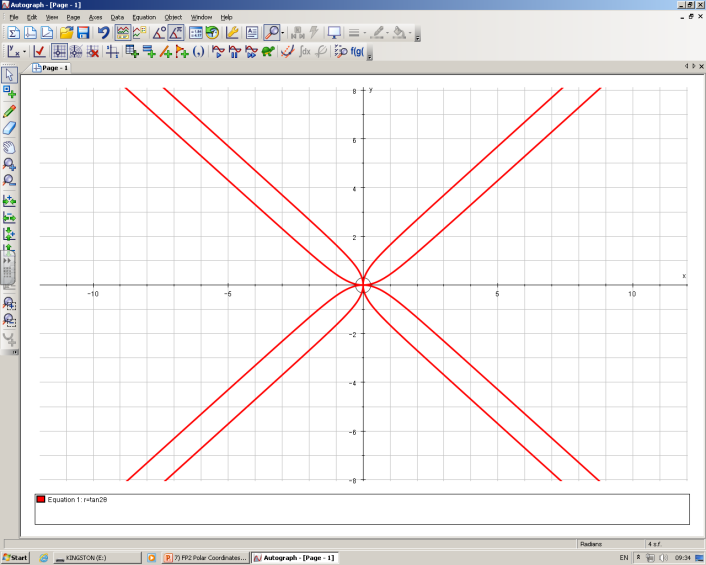
 

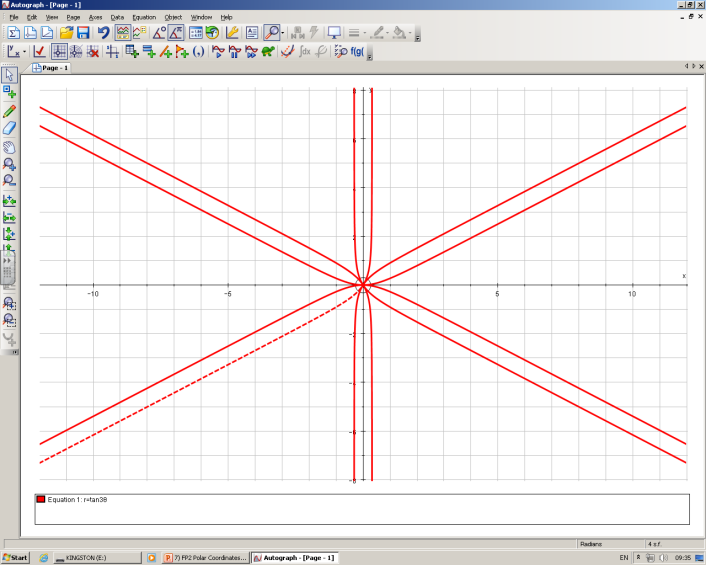
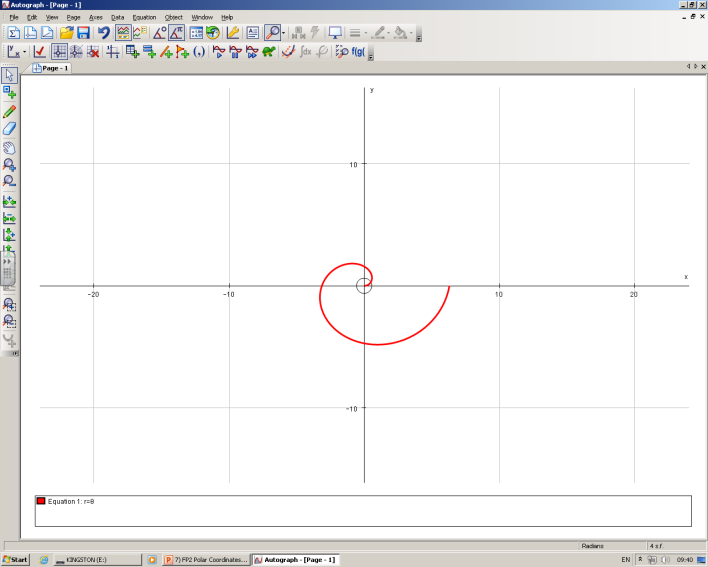
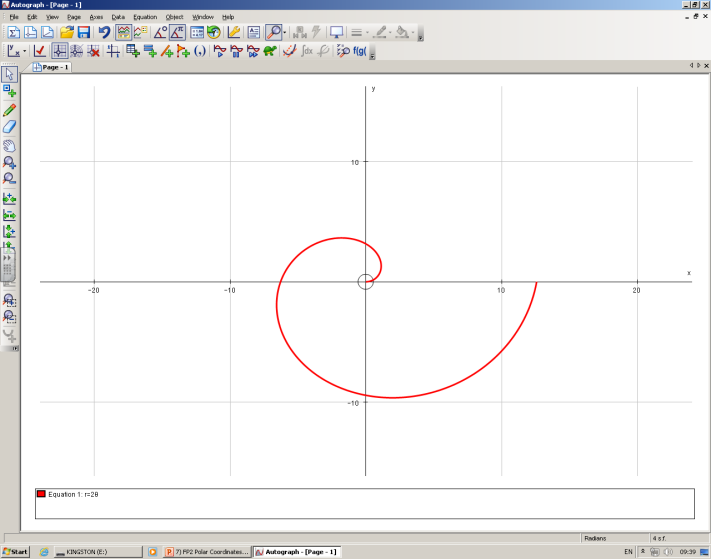
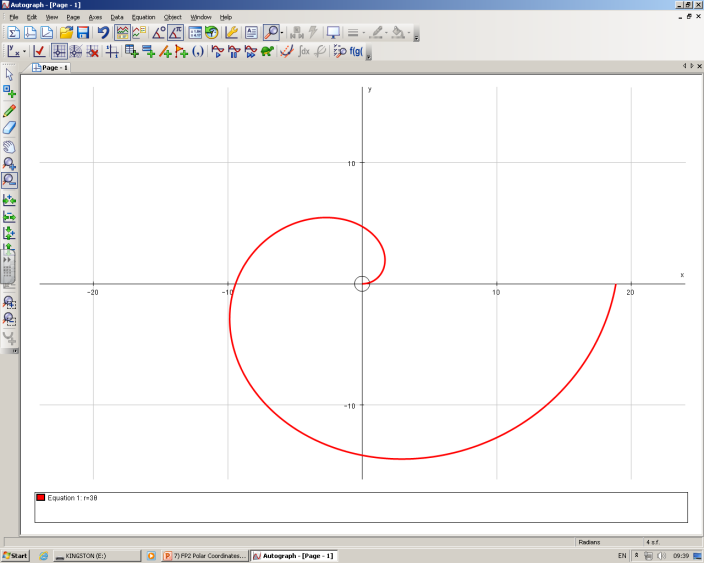
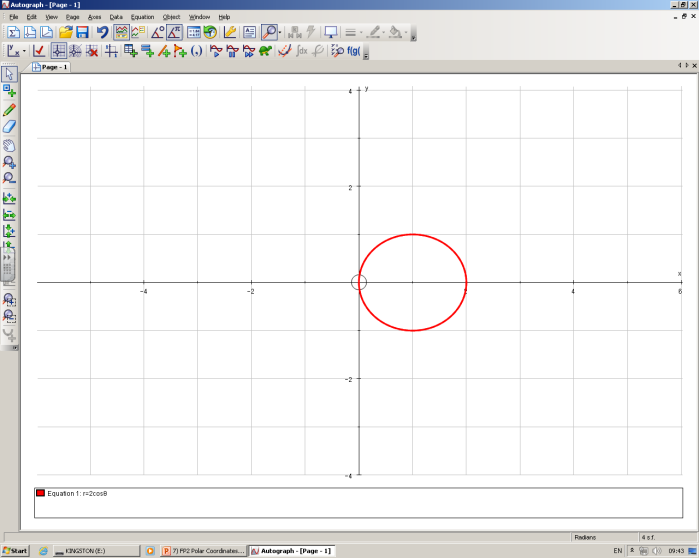
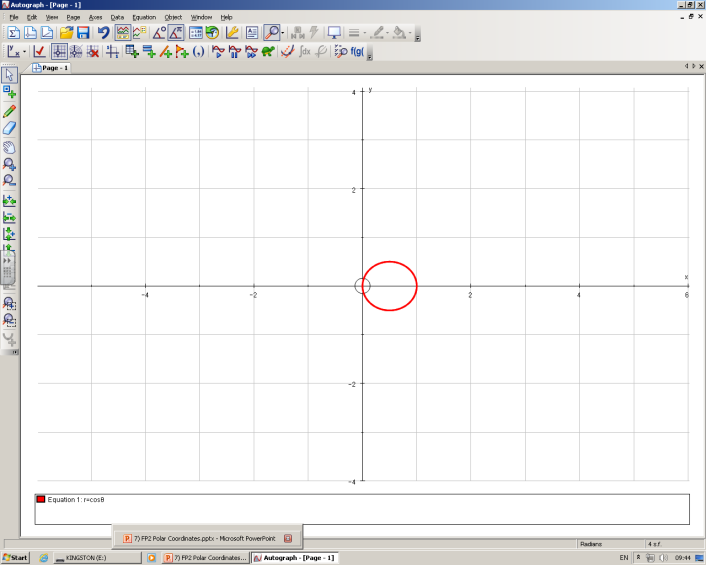
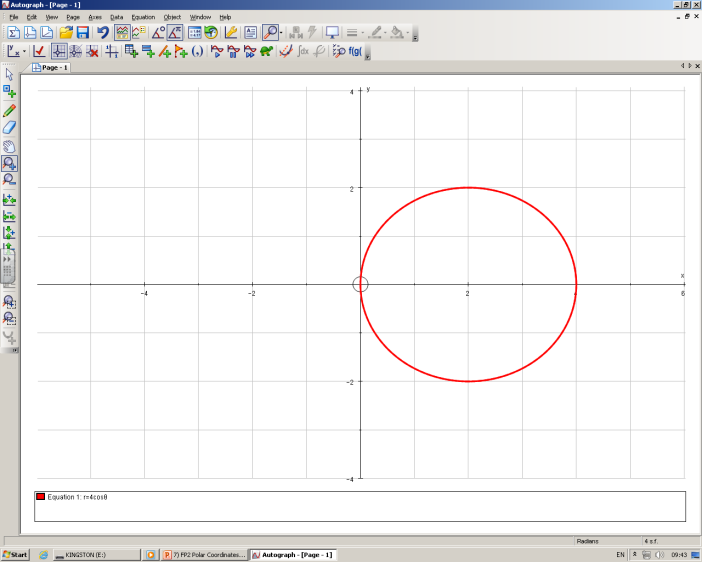
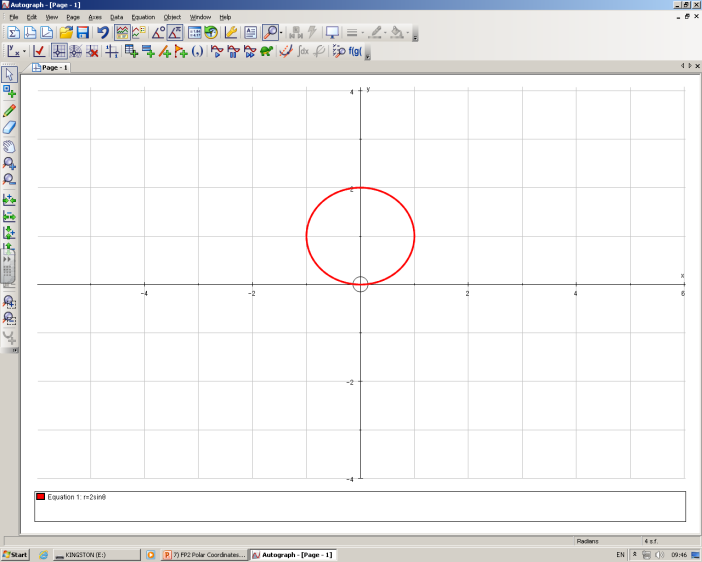
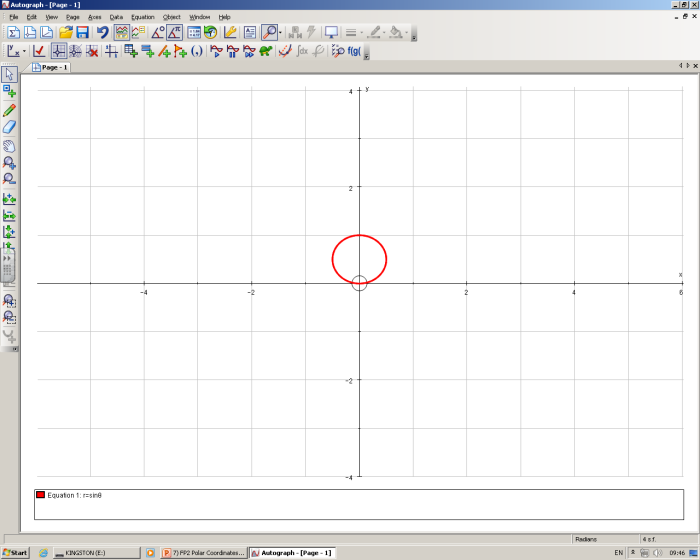
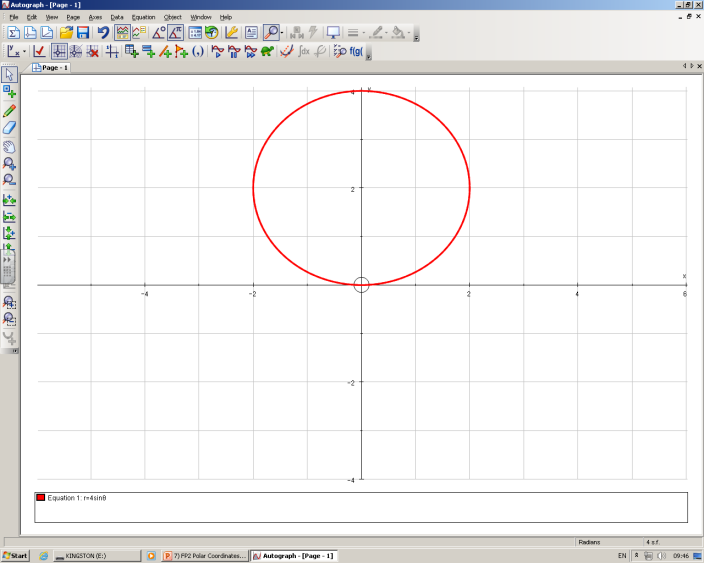
Some graphs to recognise:









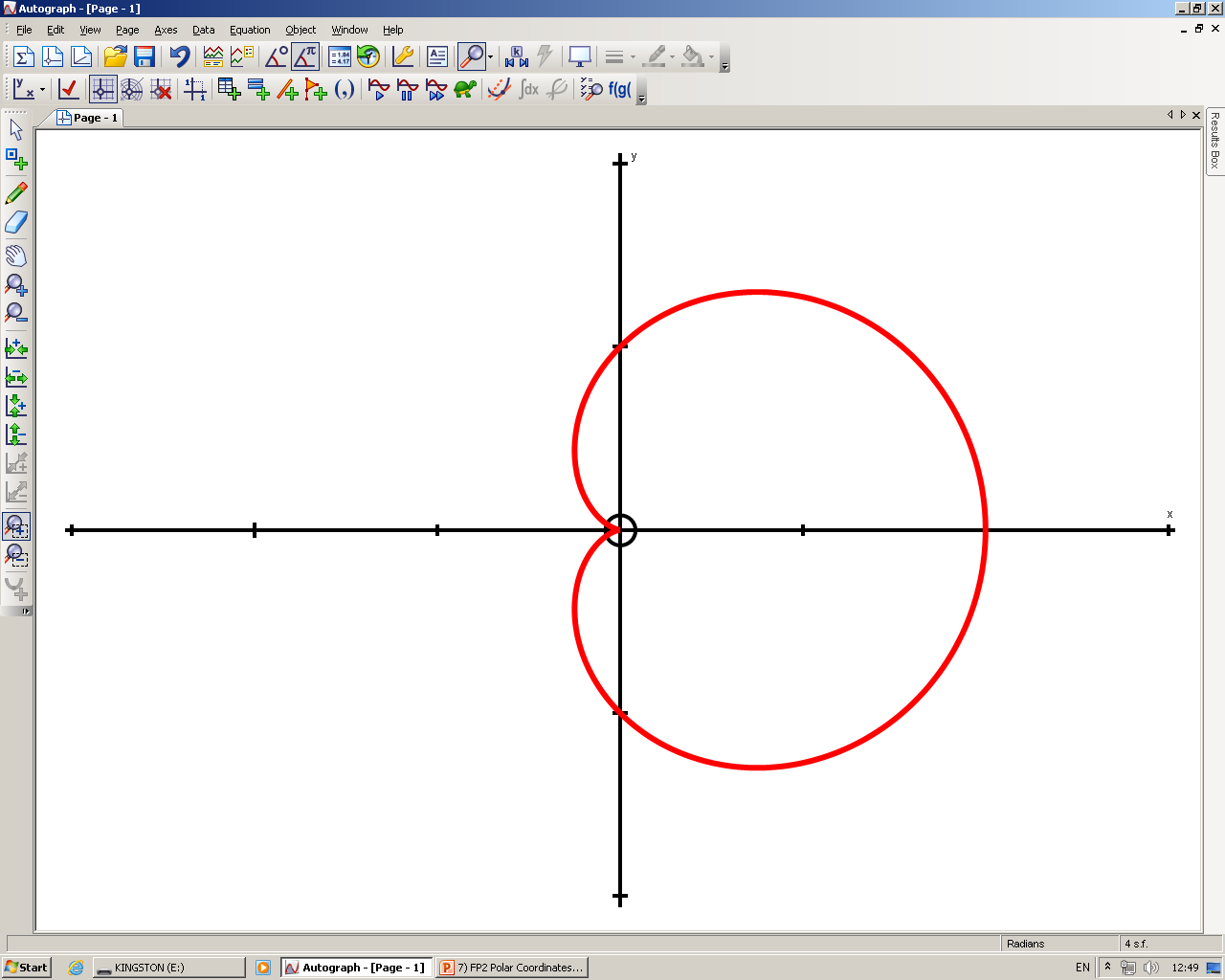


1. Show on an argand diagram the locus of points given by the values of satisfying:



1. Show that the locus of points can be represented by the polar curve:

**5C Integrating Polar Curves**



**0, 2π**

**π 2**

**π**

**3π 2**

**π 6**

**π 3**

1. Find the area enclosed by the cardioid with equation:

r = a(1 + cosθ)



1. Find the area of one loop of the curve with polar equation:

r = asin4θ



1. On the same diagram, sketch the curves with equations:

r = 2 + cosθ

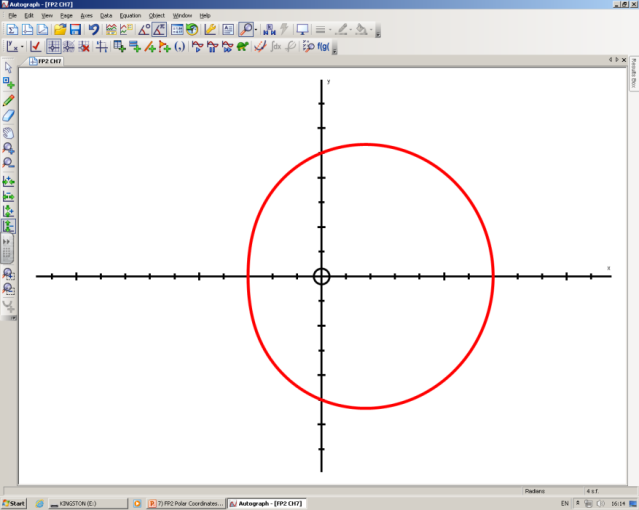
r = 5cosθ

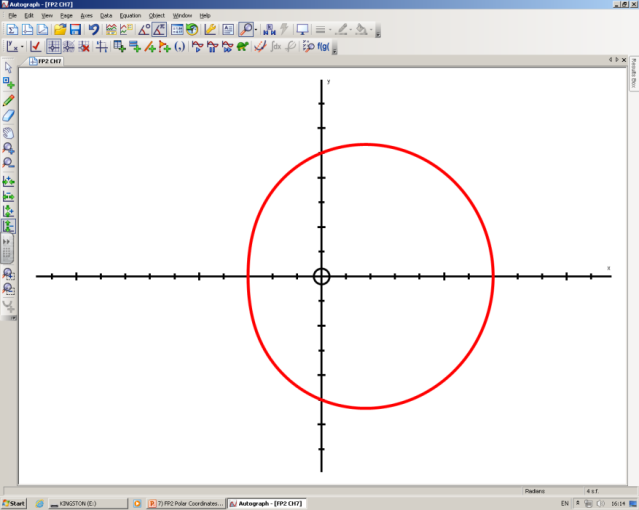


1. Find the polar coordinates of the intersection of these curves
2. Find the exact value of the finite region bounded by the 2 curves



**5D Tangents to Polar Curves**





1. Find the coordinates of the points on:

r = a(1 + cosθ)

Where the tangents are parallel to the initial line θ = 0.



1. Find the coordinates and the equations of the tangents to the curve:

r = asin2θ, 0 ≤ θ ≤ π/2

Where the tangents are:

1. Parallel to the initial line

Give answers to 3 s.f where appropriate:



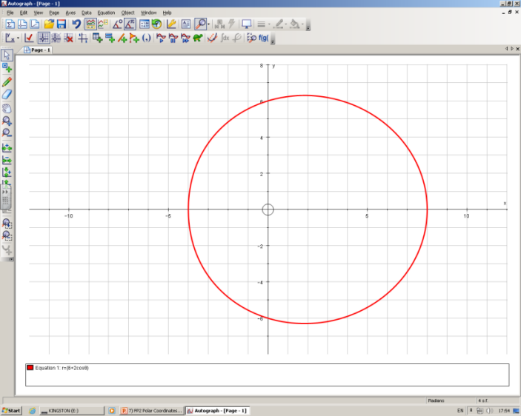
1. Perpendicular to the initial line

Give answers to 3 s.f where appropriate:

1. Prove that for:

r = (p + qcosθ), p and q both > 0 and p ≥ q

to have a ‘dimple’, p < 2q and also

p ≥ q.

