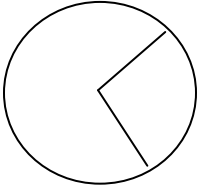


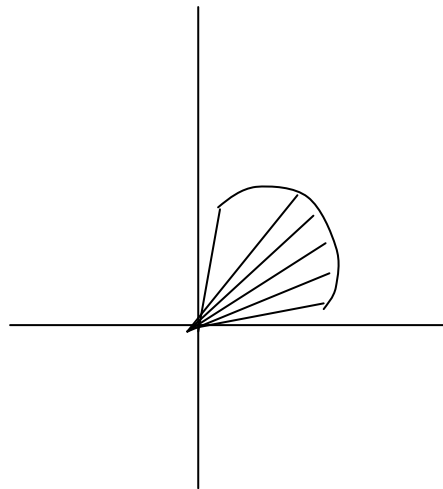
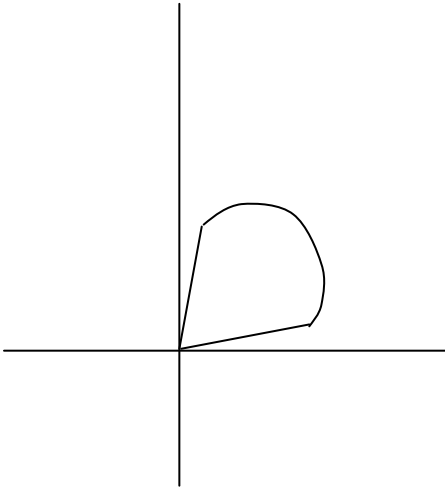
Calculus BC

Section 10.5 - Area and Arc Length in Polar Coordinates

Area of a sector given r and θ in radian is _____



Find the area of $r = f(\theta)$ bounded by the angles $\theta = \alpha$ and $\theta = \beta$.



- Instead of sums of areas of rectangles as we have done for Riemann sums, we will use sums of areas of sectors.
- When we divide into an infinite number of sectors, θ gets very small, i.e., $d\theta$

So the area of a sector changes from _____ to _____

Hence, the total area would be

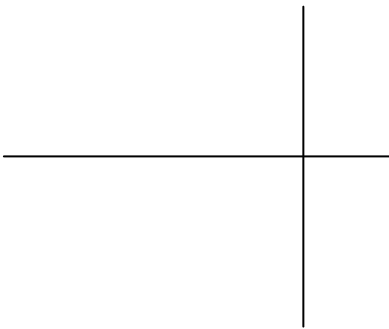
$$\text{Area} = \frac{1}{2} \int_{\alpha}^{\beta} r^2 d\theta$$

2. Find the area of one petal of $r = 2 \cos(2\theta)$

- graph

- trace one petal to find the bounds α and β

3. Find the area of the region common to the regions bounded by the circle $r = -6 \cos \theta$ and the cardioid $r = 2 - 2 \cos \theta$



Area =

a) region A is formed by $r = -6 \cos \theta$ from to

b) region B is formed by $r = 2 - 2 \cos \theta$ from to

to find , we need to find the intersection of the two graphs: