Math 1432

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Office Hours:

Mondays 1-2pm,
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(also available by appointment)

Class webpage:

http://www.math.uh.edu/~bekki/Math1432.html

Popper 32

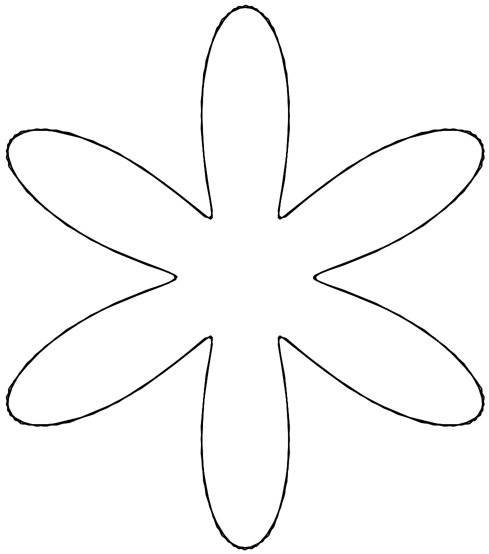
1. Which of the following is the cardioid?

2. Which of the following is the flower?

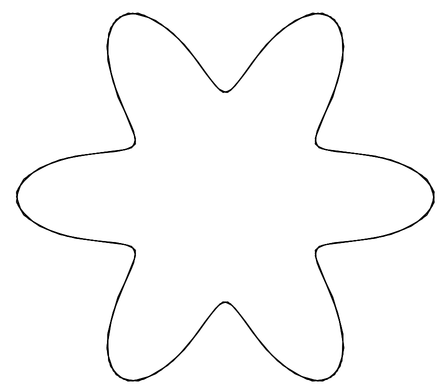
3. Which of the following is the limaçon with a dent (dimple)?

4. Which of the following is the limaçon with an inner loop?

5. Which of the following is the circle?



Area in Polar Coordinates



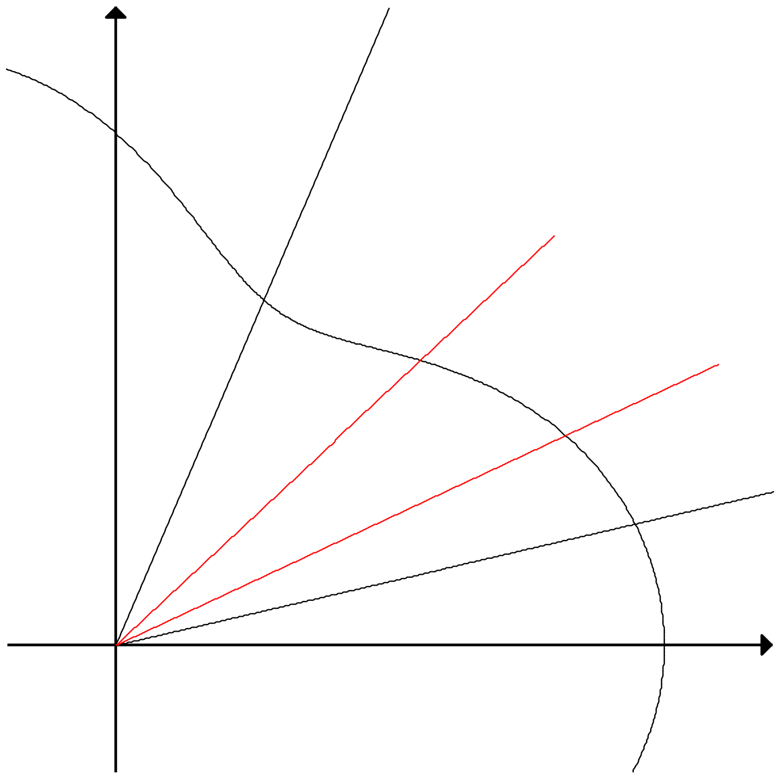
The area of a polar region is based on the area of a sector of a circle.

Area of a circle = πr^2

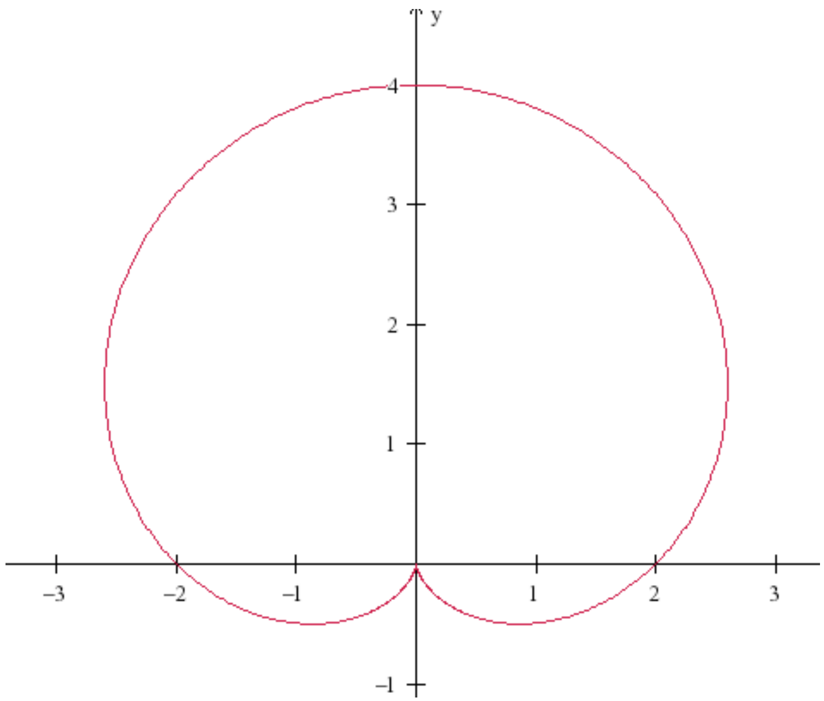
Therefore the area of a sector of a circle is the part of the circle you want times the area of the whole circle:

$$\text{Area sector} = \frac{\theta}{2\pi} \bullet \pi r^2 = \frac{1}{2} r^2 \theta$$

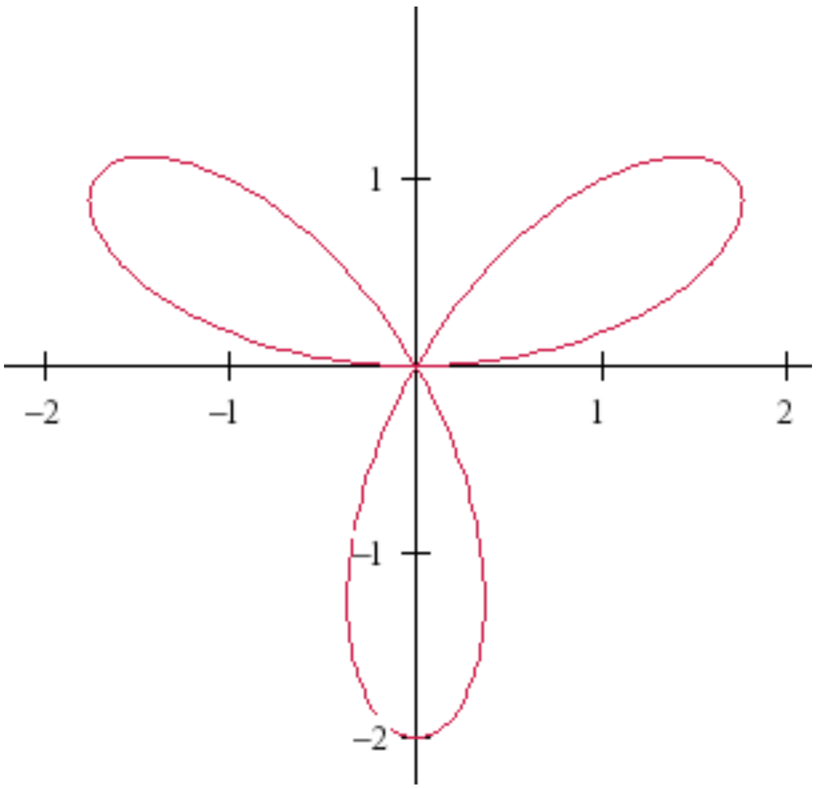
Find the area of the region between the origin and the polar graph of $r = \rho(\theta)$ for θ between a and b.



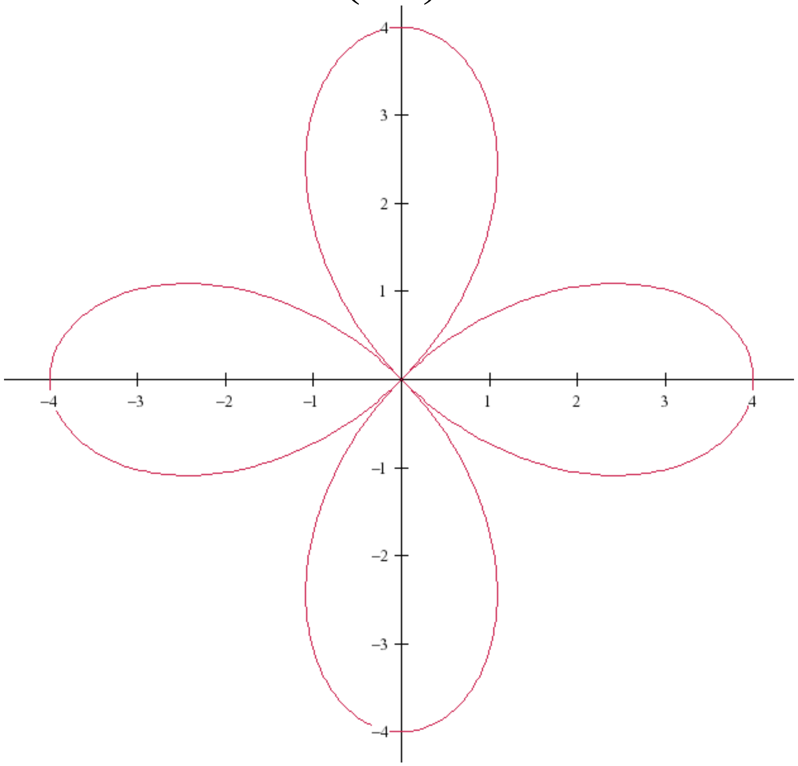
1. Find the area bounded by the graph of $r = 2 + 2\sin\theta$.



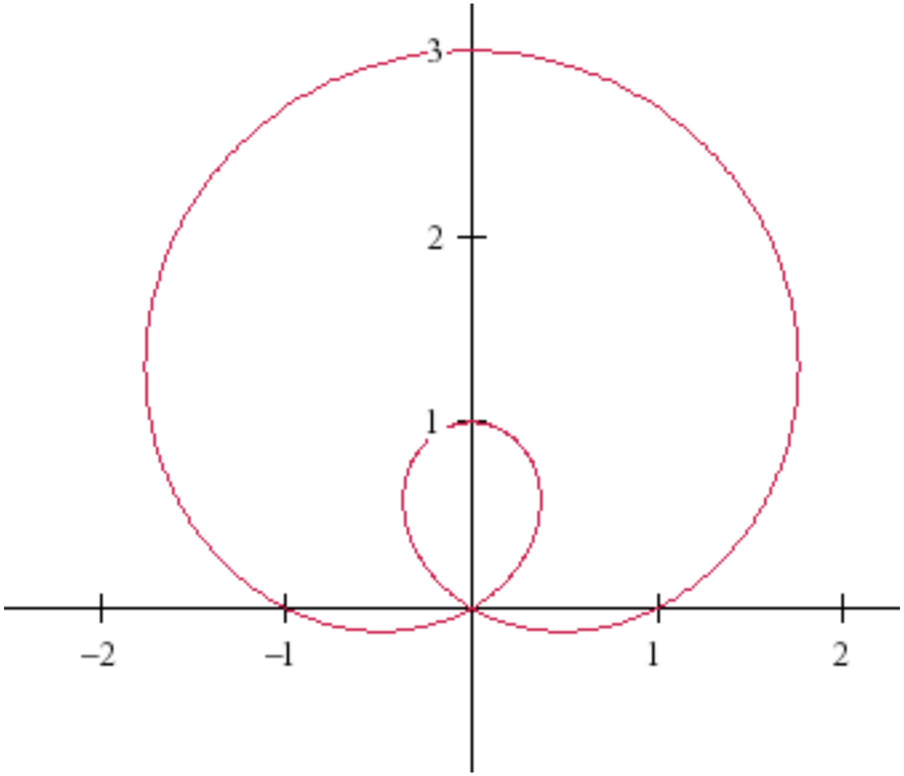
2. Find the area inside one petal of the flower given by
   $r = 2\ sin\ (3\theta)$.



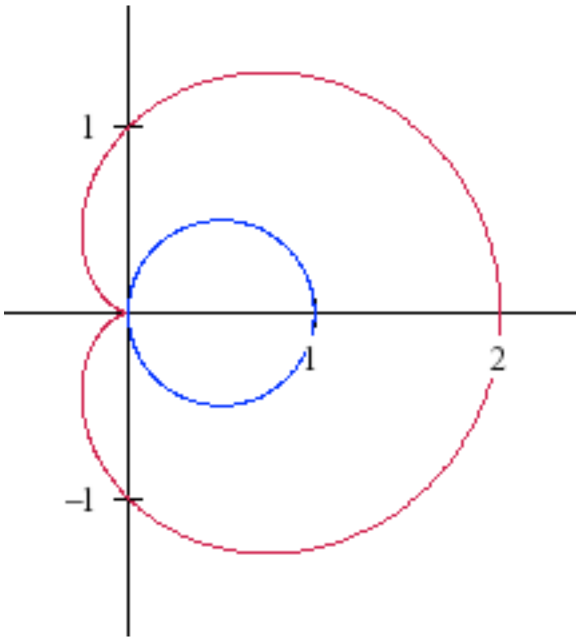
3. Find the area inside one petal of the flower given by $r = 4\,\cos(2\theta)$.



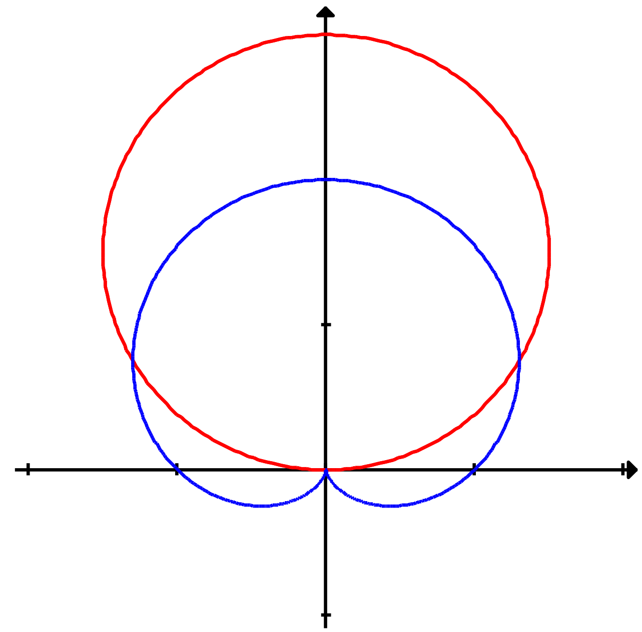
4. Find the area inside THE INNER LOOP of $r = 1+2\sin\theta$



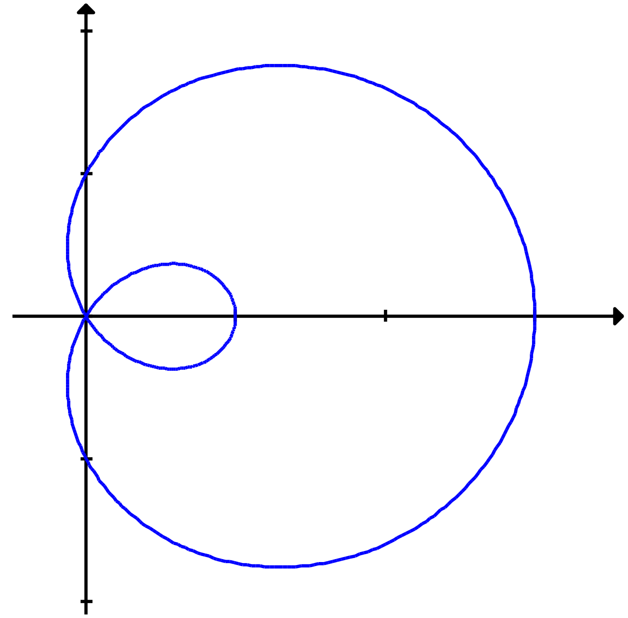
5. Write the integral to find the area between $r = 1 + \cos\theta$, $r = \cos\theta$, for $\theta = 0$ to $\theta = \pi/2$



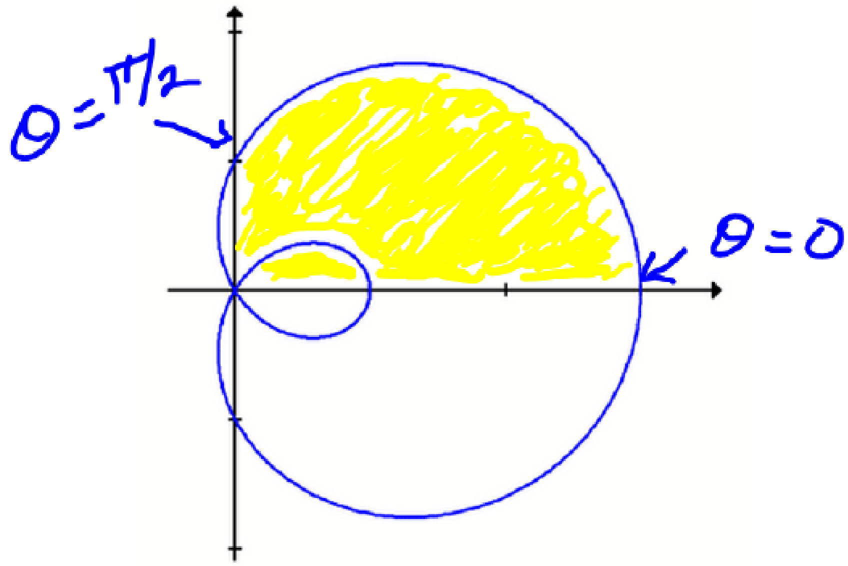
6. Find the area inside $r = 3\sin\theta$ and outside $r = 1 + \sin\theta$.



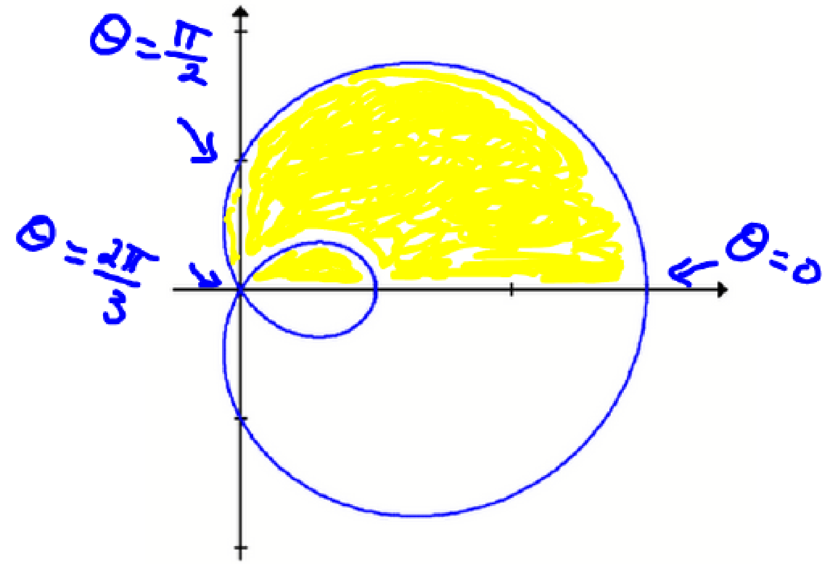
7. Find the area between the loops of $r = 1 + 2\cos\theta$.



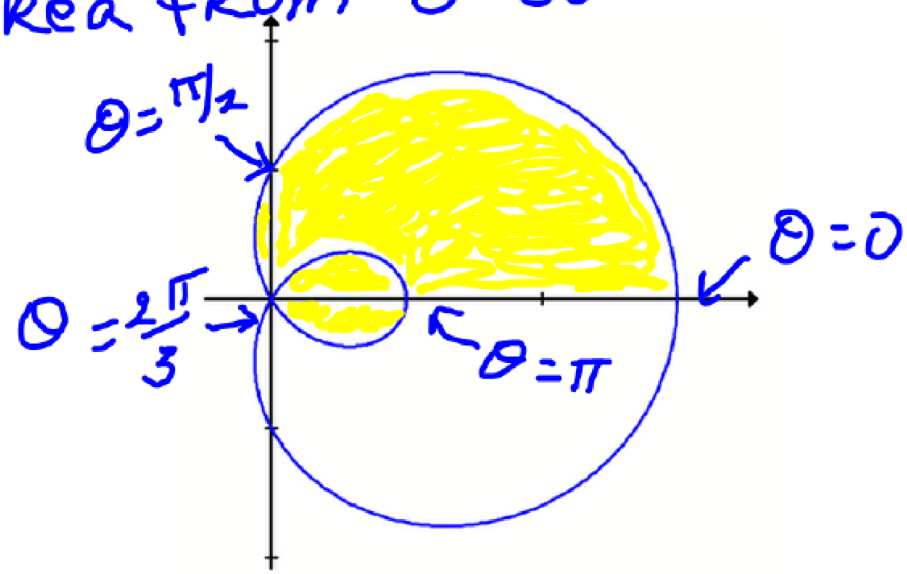
area from 0 to $\pi/2$



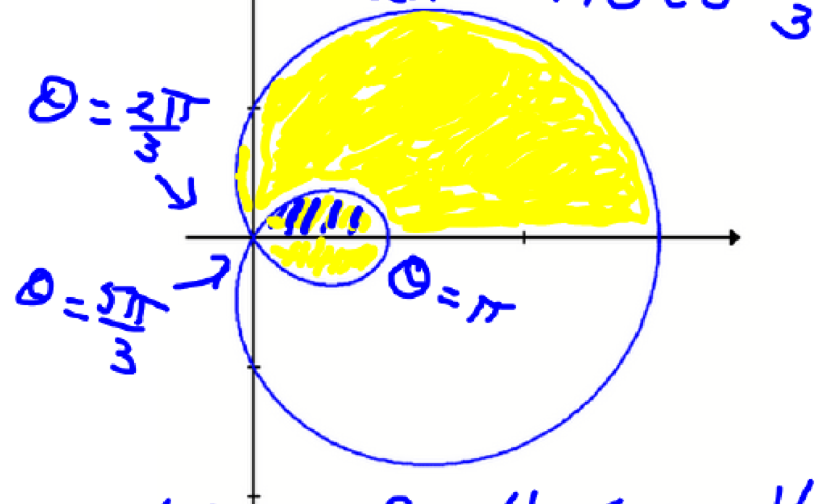
area from 0 to $\frac{2\pi}{3}$



area from 0 to π

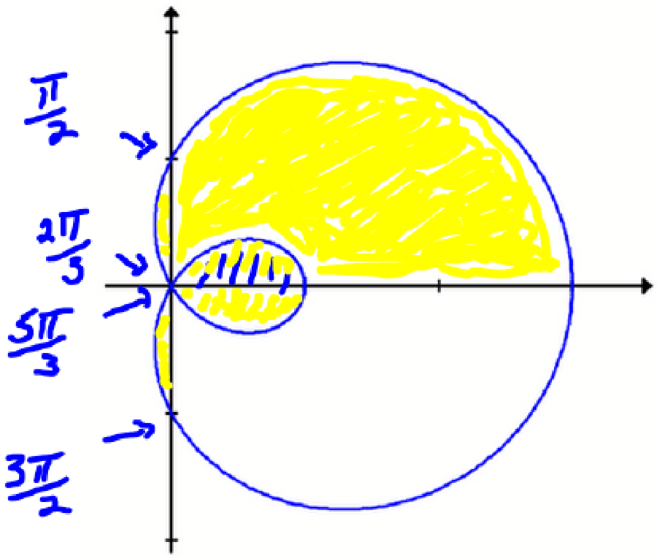


area traced from 0 to $\frac{5\pi}{3}$



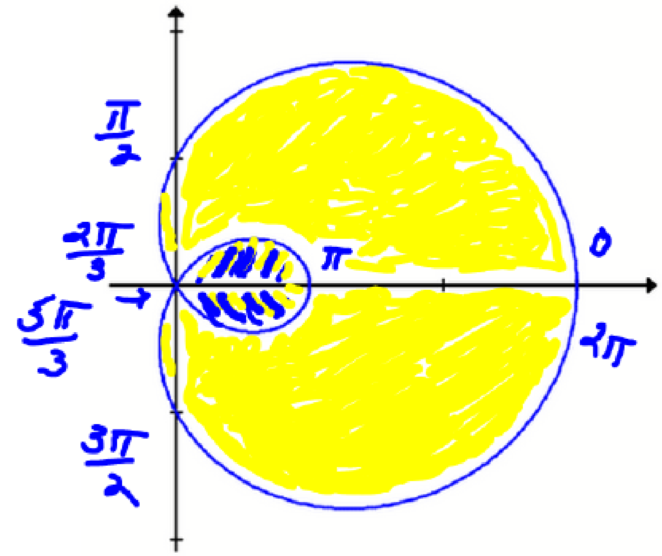
//// traced for the second time

area traced from 0 to $3\pi/2$



|||| traced twice

area traced from 0 to 2π

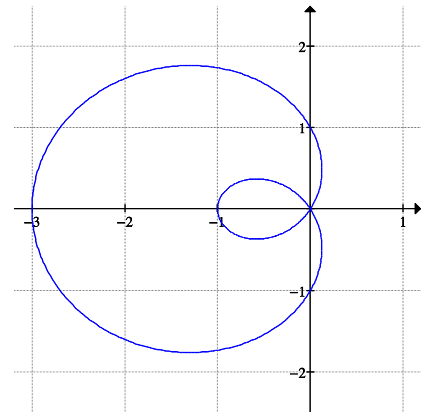


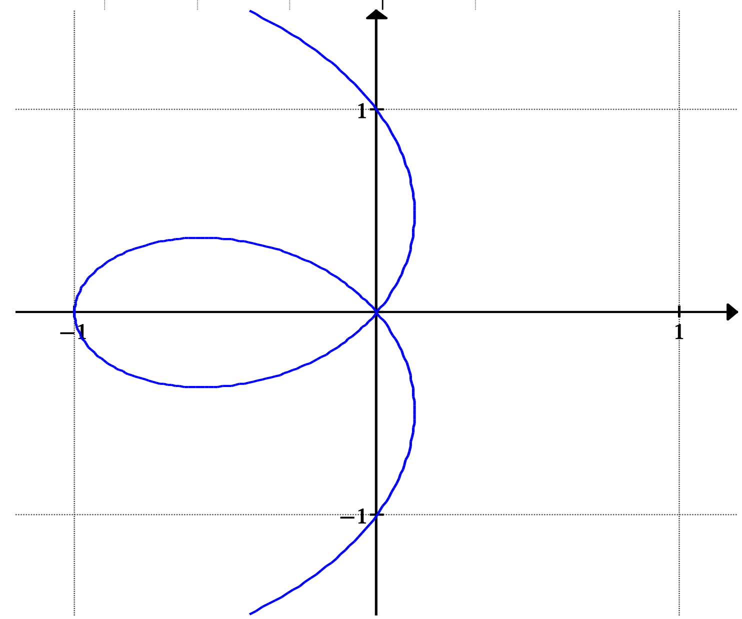
//// + \\\\ traced twice

8.

Give the area of the region that is in quadrant 4 and inside the outer loop of the polar graph

r = 1 – 2 *cos* (θ)





7. Give the integral that will determine the area inside one petal of the flower given by $r = \sin(3\theta)$.

How can we find the length of a polar curve?

$$\mathrm{L}(\mathrm{c}) = \int_{\alpha}^{\beta} \sqrt{\left[\rho(\theta)\right]^2 + \left[\rho'(\theta)\right]^2}\ \mathrm{d}\theta$$

Verify the formula for the circumference of a circle with radius *a* using the formula above.

Set up the integral to find the length of one petal of the curve $r = \cos 3\theta$

Determine the length of the perimeter of the region in Quadrant I bounded by the circles $r=2\sin\theta$ and $r=2\cos\theta$