

Quiz #2; Wed, 2/3/2016

Math 53 with Prof. Stankova

Section 110; MWF11-12

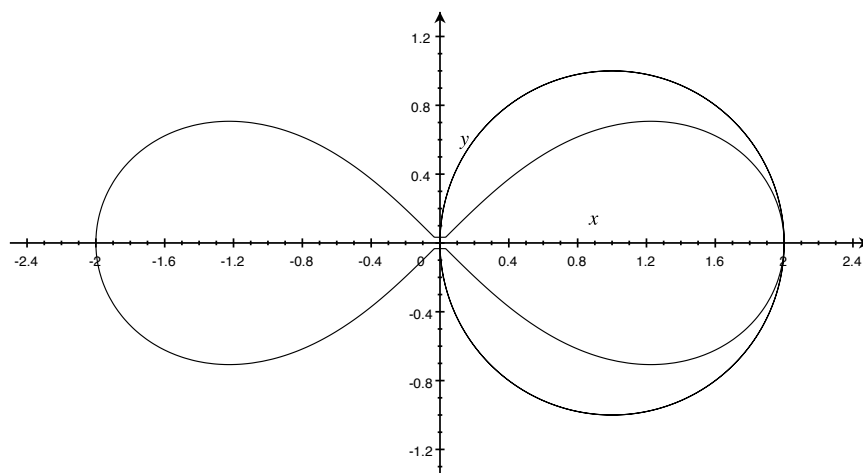
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Problem. Sketch the two curves, and find the area of the region that lies inside the first curve and outside the second curve (you do not need to evaluate the integral):

$$r = 2 \cos \theta, \quad r^2 = 4 \cos 2\theta$$

Solution. The two curves are sketched as follows:



Where the circle is the first curve and the two-petal is the second curve. The upper part of the right petal is sketched out as θ ranges from 0 to $\frac{\pi}{4}$, so its area is

$$\int_0^{\pi/4} \frac{1}{2}(4 \cos 2\theta)d\theta = \left[\sin 2\theta \right]_0^{\pi/4} = 1$$

Hence the area inside the first but outside the second is:

$$\pi - 2$$