

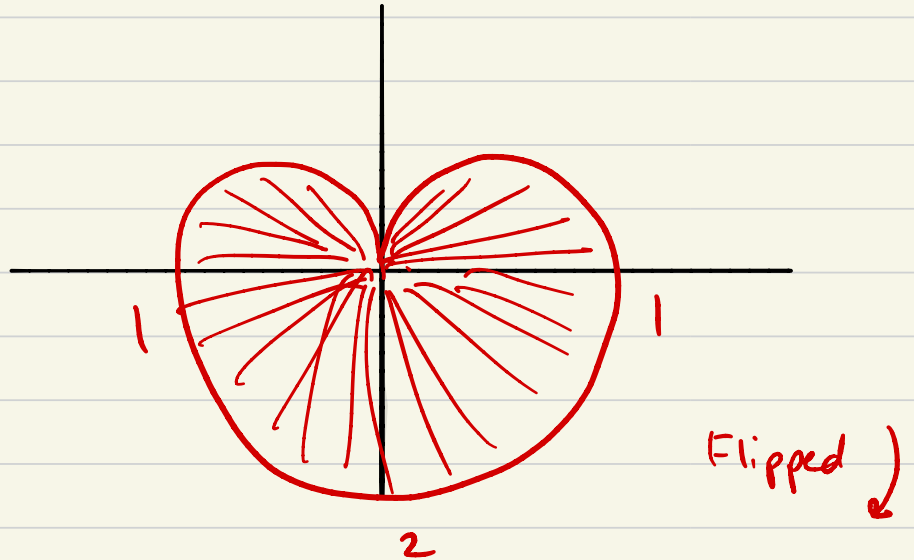
Homework 22 Final Answers

Section 10.4

10. $r = 1 - \sin\theta$

$$A = \frac{1}{2} \int_0^{2\pi} (1 - \sin\theta)^2 d\theta$$

$$= \dots = \boxed{\frac{3\pi}{2}}$$

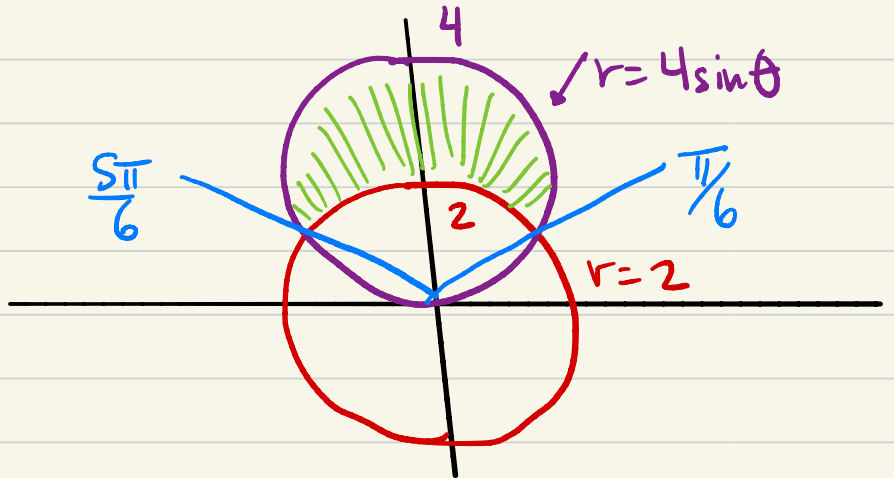


23. Inside $r = 4\sin\theta$ Outside $r = 2$

Intersect?

$$\theta = \pi/6, 5\pi/6$$

(show why?)

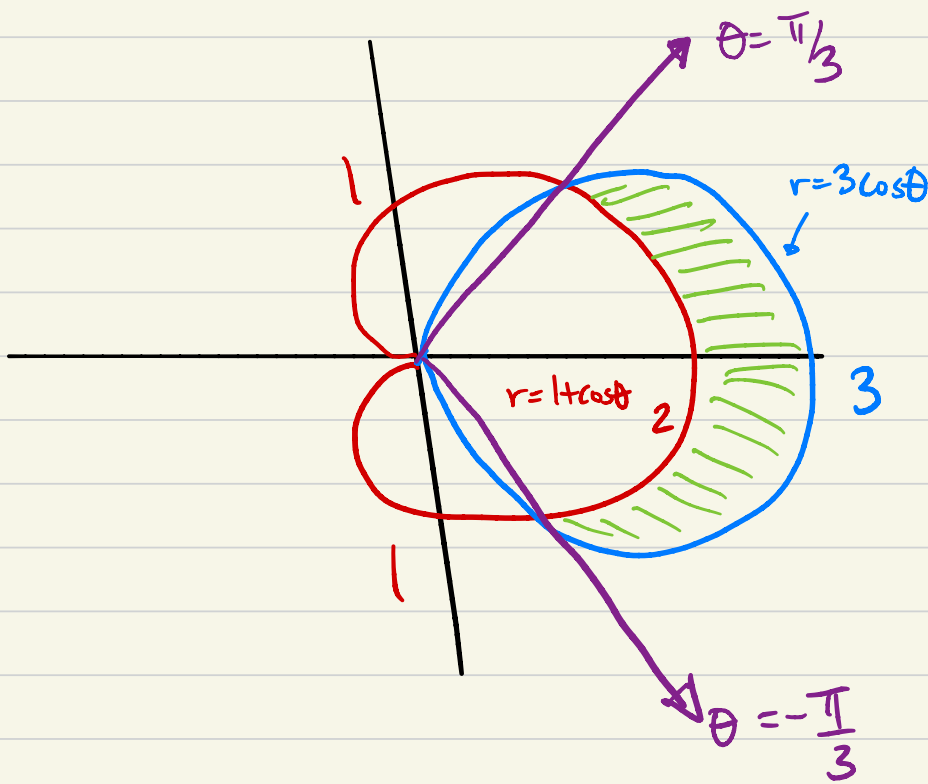


$$A = \frac{1}{2} \int_{\pi/6}^{5\pi/6} (4\sin\theta)^2 - (2)^2 d\theta = \dots = \boxed{\frac{4\pi}{3} + 2\sqrt{3}}$$

$$\text{OR} = 2 \left[\frac{1}{2} \int_{\pi/6}^{\pi/2} \dots d\theta \right]$$

Double using Symmetry

27. Inside $r = 3\cos\theta$, Outside $r = 1 + \cos\theta$



Intersect?

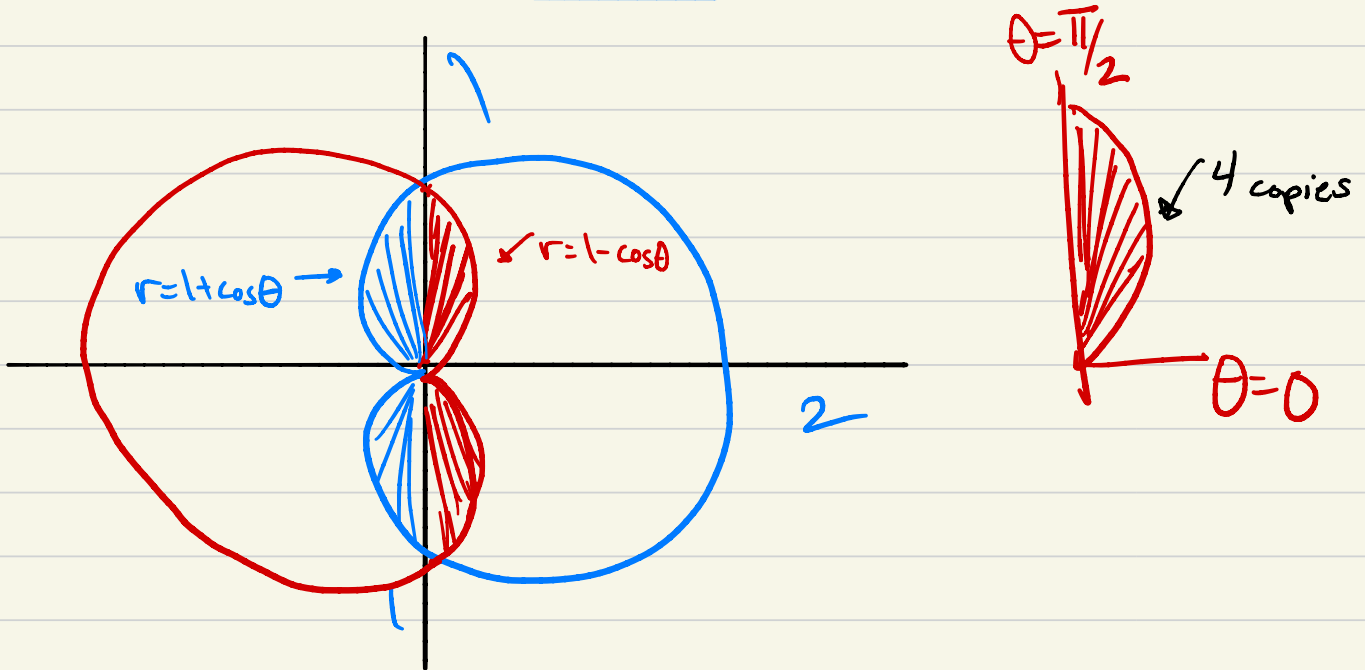
$\theta = \pm \pi/3$
(Justify why?)

$$\text{Area} = \frac{1}{2} \int_{-\pi/3}^{\pi/3} (3\cos\theta)^2 - (1 + \cos\theta)^2 d\theta = \boxed{\pi}$$

$$\cancel{OR} = 2 \left[\frac{1}{2} \int_0^{\pi/3} \dots d\theta \right]$$

Double
using
Symmetry

30. Bounded Between $r = 1 + \cos\theta$ and $r = 1 - \cos\theta$



Lots of Choices

$$A = 4 \left[\frac{1}{2} \int_0^{\pi/2} (1 - \cos\theta)^2 d\theta \right] = \dots = \boxed{\frac{3\pi}{2} - 4}$$

using
Symmetry

$$\text{OR } 2 \left[\frac{1}{2} \int_{\pi/2}^{3\pi/2} (1 + \cos\theta)^2 d\theta \right]$$

$$\text{OR } 2 \left[\frac{1}{2} \int_{-\pi/2}^{\pi/2} (1 - \cos\theta)^2 d\theta \right]$$

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BONUS: Do Full Cartesian to Polar Curve Sketching

$$A = 11\pi - 12\sqrt{2}$$