MATH 119: Quiz 6

Name: _____

Directions:

- Show your thought process (commonly said as "show your work") when solving each problem for full credit. **Remember to fully simplify.**
- If you do not know how to solve a problem, try your best and/or explain in English what you would do.
- Good luck!

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1. Convert the rectangular coordinate $(-2, 1)$ into polar coordinates.

Skip

2. Convert the polar equation

$$r = 6\csc\theta$$

into a rectangular equation.

need sin θ for r sin θ → $r = 6 \cdot \frac{1}{\sin\theta}$ ← need r for $y = r\sin\theta$

$\sin(\theta) \cdot r = 6 \cdot \frac{1}{\sin\theta} \cdot \sin\theta$

$r\sin\theta = 6$

$\boxed{y = 6}$

3. Solve the equation

$$2\cos^2\theta - 1 = 0$$

goal: need "$\cos\theta = \#$"

$$2\cos^2\theta - 1 = 0$$

$$2\cos^2\theta = 1$$

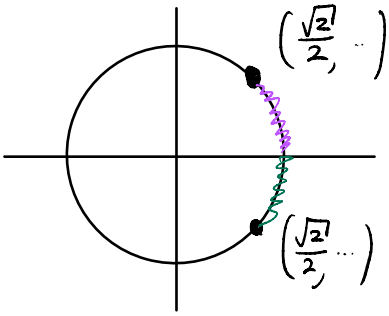
$$\cos^2\theta = \frac{1}{2}$$

root splits into num/denom by Law of Exp #5

$$\sqrt{\cos^2\theta} = \pm\sqrt{\frac{1}{2}} = \pm\left(\frac{1}{2}\right)^{\frac{1}{2}} = \pm\frac{1^{\frac{1}{2}}}{2^{\frac{1}{2}}} = \pm\frac{\sqrt{1}}{\sqrt{2}}$$

$$\cos\theta = \pm\frac{1}{\sqrt{2}}\cdot\frac{\sqrt{2}}{\sqrt{2}} = \pm\frac{\sqrt{2}}{2}$$

$\cos\theta = \frac{\sqrt{2}}{2}$

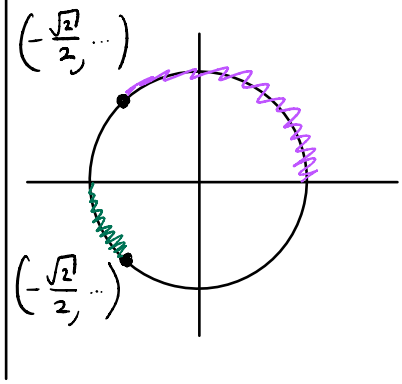


(1) one period

$\theta = \frac{\pi}{4}$

$\theta = \frac{7\pi}{4}$

$\cos\theta = -\frac{\sqrt{2}}{2}$



$\theta = \frac{3\pi}{4}$

$\theta = \frac{5\pi}{4}$

(2) periodicity

$$\theta = \frac{\pi}{4} + 2k\pi$$

$$\theta = \frac{3\pi}{4} + 2k\pi$$

$$\theta = \frac{5\pi}{4} + 2k\pi$$

$$\theta = \frac{7\pi}{4} + 2k\pi$$

$k \in \mathbb{Z}$

or

$$\theta = \frac{\pi}{4} + k\pi$$

$$\theta = \frac{3\pi}{4} + k\pi$$

$k \in \mathbb{Z}$