

Homework #21Due **Friday, December 3rd** in Gradescope by 11:59 pm ET

Goal: Exploring Polar Coordinates and their relation to Cartesian Coordinates, and Sketching Polar Curves.

For 1-3, Plot the point with the given Polar coordinates. Label everything. Then find the Cartesian coordinates of the point.

$$1. (r, \theta) = \left(2, \frac{3\pi}{2}\right) \quad 2. (r, \theta) = \left(\sqrt{2}, \frac{\pi}{4}\right) \quad 3. (r, \theta) = \left(-1, -\frac{\pi}{6}\right)$$

For 4-5, Plot the point of the given Cartesian coordinates. Label everything.

First, find Polar coordinates (r, θ) of the point, where $r > 0$. Keep $0 \leq \theta < 2\pi$.

Second, find Polar coordinates (r, θ) of the point, where $r < 0$. Keep $0 \leq \theta < 2\pi$.

$$4. (x, y) = (-4, 4) \quad 5. (x, y) = (3, 3\sqrt{3})$$

For 6-9, Shade or Sketch the region in the plane consisting of points whose Polar coordinates satisfy the given conditions. Label everything.

$$6. r \geq 1 \quad 7. r \geq 0 \text{ and } \frac{\pi}{4} \leq \theta \leq \frac{3\pi}{4}$$

$$8. 1 \leq r \leq 3 \text{ and } \frac{\pi}{6} < \theta < \frac{5\pi}{6} \quad 9. 2 < r < 3 \text{ and } \frac{4\pi}{3} \leq \theta \leq \frac{5\pi}{3}$$

For 10-14, Carefully sketch each of the following. Show all work. Also show both the Cartesian Plot and the final Polar plot. Label everything.

$$10. r = 2 \cos \theta \quad 11. r = 3 \sin \theta$$

$$12. r = 1 + \sin \theta \quad 13. r = 2 + 2 \cos \theta \quad 14. r = 3 - 3 \sin \theta$$

IMPORTANT NOTE! You will be receiving an e-mail from the math department to fill out a course/teaching evaluation. These are important to me and the course and the College, so I will appreciate it if you take the time to fully fill them out. Thanks so much!

REGULAR OFFICE HOURS

Monday: 1:00–3:00 pm

9–10:30 pm TA Mia, SMUDD 207

Tuesday: 12:00–4:00 pm

6–7:30 pm TA Ian, SMUDD 207

7:30–9:00 pm TA Karime, SMUDD 207

Wednesday: 1:00–3:00 pm

6–7:30 pm TA Ian, SMUDD 207

7:30–9:00 pm TA Daksha, SMUDD 207

Thursday: none for Professor

1–2:30 pm TA Mia, SMUDD 207

7:30–9:00 pm TA Daksha, SMUDD 207

Friday: 12:00–2:00 pm

2:30–4:00 pm TA Karime, SMUDD 014**

Keep reading your notes every night...