

Homework #21

Due **Friday, May 13th** 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. $(r, \theta) = \left(2, \frac{3\pi}{2}\right)$ 2. $(r, \theta) = \left(\sqrt{2}, \frac{\pi}{4}\right)$ 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. $(x, y) = (-4, 4)$ 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. $r \geq 1$ 7. $r \geq 0$ and $\frac{\pi}{4} \leq \theta \leq \frac{3\pi}{4}$

8. $1 \leq r \leq 3$ and $\frac{\pi}{6} < \theta < \frac{5\pi}{6}$ 9. $2 < r < 3$ 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. $r = 2 \cos \theta$ 11. $r = 3 \sin \theta$

12. $r = 1 + \sin \theta$ 13. $r = 2 + 2 \cos \theta$ 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

Sunday: 6–7:30 pm TA Nico, SMUDD 207

Monday: 1:00–3:00 pm

6–7:30 pm TA Daksha, SMUDD 207

7:30–9:00 pm TA Karime, SMUDD 207

Tuesday: 12:00–4:00 pm

6–7:30 pm TA Ian, SMUDD 207

7:30–9:00 pm TA Nico, SMUDD 207

Wednesday: 1:00–3:00 pm

9–10:30 pm TA Daksha, SMUDD 207

Thursday: none for Professor

6–7:30 pm TA Ian, SMUDD 207

7:30–9:00 pm TA Karime, SMUDD 207

Friday: 12:00–2:00 pm

Keep reading your notes every night...