Math 121, Section(s) 01, 02, Fall 2024

Homework #19

Due **Friday, December 6th** 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 6-11, Carefully sketch each of the following Polar curves. **Show all work. Also show both the Cartesian Plot and the final Polar plot. Label everything.**

6. $r = 2\cos\theta$ 7. $r = 3\sin\theta$

8. $r = 1 + \sin\theta$ 9. $r = 2 + 2\cos\theta$ 10. $r = 3 - 3\sin\theta$

11. NEW! Try it! Flower-petal-leaved rose $r = 2\sin(2\theta)$

REVIEW: Compute the following Integrals.

12. $\displaystyle\int \frac{x^3}{(x^2+4)^{\frac{7}{2}}}\,dx$ 13. $\displaystyle\int \frac{1}{(x^2+4)^2}\,dx$

14. $\displaystyle\int_0^e \frac{\ln x}{\sqrt{x}}\,dx$ 15. $\displaystyle\int_0^{e^3} \frac{1}{x\left[9 + (\ln x)^2\right]}\,dx$

IMPORTANT NOTE! You will be receiving an e-mail from the math department to fill out a course/teaching evaluation. These are really important to me,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 6:00–9:00 pm TAs Natalie/Oscar, SMUDD 207

Monday: 12:00–3:00 pm

6:00–9:00 pm TAs Aaron/Oscar, SMUDD 207

Tuesday: 1:00–4:00 pm

6–7:30 pm TA Gretta, SMUDD 207

Wednesday: 1:00-3:00 pm

7:30–9:00 pm TA Natalie, SMUDD 207

Thursday: none for Professor

extras may be added, TBD weekly

6–9:00 pm TAs Gretta/DJ, SMUDD 207

Friday: 12:00–3:00 pm

6:00–9:00 pm TAs Aaron/DJ, SMUDD 207

Keep reading your notes every night...