

**Homework #19**

Due **Friday, May 2nd** 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  $(r, \theta)$  of the point, where  $r > 0$ . Keep  $0 \leq \theta < 2\pi$ .

Second, find Polar coordinates  $(r, \theta)$  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.  $\int \frac{x^3}{(x^2 + 4)^{\frac{7}{2}}} dx$       13.  $\int \frac{1}{(x^2 + 4)^2} dx$

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

**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

**Monday: 12:00–3:00 pm**

6:00–7:30 pm TA Jude, SMUDD 207

**Tuesday: 1:00–4:00 pm**

6–7:30 pm TA Aaron, SMUDD 207

**Wednesday: 1:00–3:00 pm**

6–7:30 pm TA Jude, SMUDD 207

7:30–9:00 pm TA Aaron, SMUDD 207

**Thursday: none for Professor**

extras may be added, TBD weekly

7:30–9:00 pm TA DJ, SMUDD 207

**Friday: 12:00–3:00 pm**

7:30–9:00 pm TA DJ, SMUDD 207

Keep reading your notes every night...