

Section 8.2 Learning Objectives:

- Video 1: Polar Coordinates (10:24)
 - State the formulas that relate Cartesian and polar coordinates.
 - Convert from Cartesian coordinates to polar coordinates and from polar coordinates to Cartesian coordinates.
 - Understand the relationship between polar coordinates and trigonometry.
- Video 2: Converting Equations (7:28)
 - Convert polar equations to Cartesian equations and Cartesian equations to polar equations.
- Video 3: Polar Graphs (14:27)
 - Graph basic polar curves.

Individual Learning Objective Binder Check: Before class, you should have completed the Learning Objective Worksheet for each of the learning objectives in the video. These should have been placed in a binder in an organized manner so that it can be quickly checked by the instructor. If you have specific questions, this is a good time to ask the professor about them. While you are waiting for the professor to make their way around the room, you can work on the rest of the activities.

Group Practice Problems: In a group of no more than 3 students, work on the following problems. While everyone in the group should work together, each student should write out their work for themselves. This work can prove to be helpful when working on the homework assignment. If questions arise as you're working on these problems, feel free to seek help from the instructor or other groups of students.

Group Practice Problems #1 - Polar Graphing: Plot the points on a polar graph. (Feel free to plot multiple points on a single graph as long as they are clearly labeled.)

- $(3, 45^\circ)$
- $(1, 165^\circ)$
- $(-4, 150^\circ)$
- $(2, \frac{5\pi}{6})$
- $(-3, -\frac{2\pi}{3})$
- $(-5, \frac{7\pi}{3})$

Group Practice Problems #2 - Converting Points from Polar to Cartesian: Plot the point then convert it from polar coordinates to Cartesian coordinates.

- $(2, \frac{\pi}{3})$
- $(4, 70^\circ)$
- $(1, 2)$ (Hint: The angle is in radians and you will need a calculator.)

Group Practice Problems #3 - Converting Points from Cartesian to Polar: Plot the point then convert it from Cartesian coordinates to polar coordinates.

- $(3, 5)$

- $(-4, -9)$
- $(2, \pi)$ (Hint: Remember that this is given in Cartesian coordinates!)

Group Practice Problems #4 - Converting Equations from Polar to Cartesian: Convert the equation from polar coordinates to Cartesian coordinates.

- $r = 4$
- $r \cos(\theta) + 3r \sin(\theta) = 5$
- $\frac{1}{r^2} = \sin(2\theta)$ (Hint: Use the double angle formula.)

Group Practice Problems #5 - Converting Equations from Cartesian to polar: Convert the equation from Cartesian coordinates to polar coordinates.

- $x^2 + y^2 = 9$
- $x^2 + (y - 2)^2 = 4$

Group Practice Problems #6 - Polar Graphing: Plot the graph as an rectangular graph and use that to graph the polar graph.

- $r = 2 \cos(\theta)$
- $r = 2 \cos(\theta) + 1$
- $r = 2 \cos(\theta) + 2$

Group Work Check: Present your work for the practice problems to the instructor for approval. The work will not be graded deeply, but simply graded on whether it appears that you have put in a good faith effort to do the work. If you are not confident about particular problems, this is a good time to ask about them.

Section 8.2 Homework:

- 8.2 (General Problems): #1, 5, 9, 13, 17, 21, 25, 29, 33, 49, 53, 57
- 8.2 (Write-Up): #43-48 (Explain the reasoning you applied to determine the match)

