

Introduction

Recall that in the Cartesian plane, a solution to a system of equations is a point at which all the graphs of the system *intersect*.

Also, if (x, y) is a solution, then (x, y) *satisfies* all of the equations in the system.

Polar Solutions

In the polar coordinate plane, intersections are not always what they seem. Sometimes it *appears* that two graphs intersect, but they don't!

Wait... What?

Today we'll learn to distinguish between "real" and "fake" intersections in polar systems.

Your Task

Determine the number of solutions in the following system of polar functions.

$$r_1 = 3 + 2\cos\theta$$

$$r_2 = 5\sin(2\theta)$$

Support your answer graphically and numerically.

Then describe the similarities and/or differences you've observed between graphical solutions of Cartesian systems and polar systems.