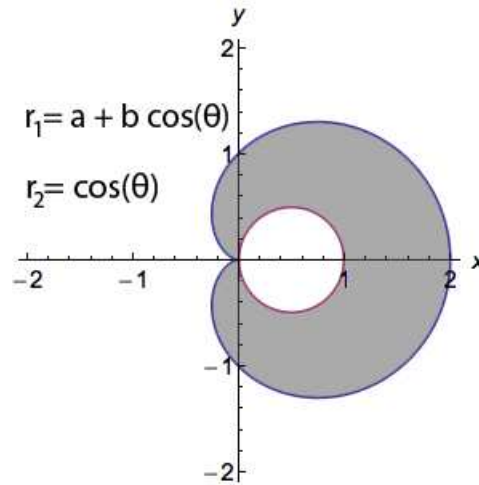


6. [8 points] Members of the recruitment committee for the Mars University (MU) chapter of the fraternity Epsilon Rho Rho are designing a pledge pin to distribute during Rush Week. The pin takes the shape of a cardioid with a circular hole in it. The cardioid is given by a polar equation of the form $r_1 = a + b \cos(\theta)$, while the circular hole has the polar equation $r_2 = \cos(\theta)$. The pin is pictured below, where the x - and y -axes are measured in inches.



- a. [5 points] The committee plans on coating one side of the pin in gold plating, which costs 3 dollars per square inch. Give an expression representing the cost to plate one face of the pin in gold. Your answer may involve integrals and the constants a and b .

- b. [3 points] Find a and b .

$$a = \underline{\hspace{2cm}} \quad b = \underline{\hspace{2cm}}$$