PROBLEM CORNER

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Problem 1 *We suppose that we have n white balls and n black balls which we are going to place in two urns A and B in any way we please, as long as at least one ball is placed into each urn. After this has been done, a second person walks into the room and selects one ball at random. Our problem is to maximize the probability that this person draws a white ball.*

The next problem can be done by using the Green's Theorem when one learns the multivariable calculus. Try to think how you may solve the problem without using the Green's Theorem.

Problem 2 *Suppose we are given two curves, one is cardioid of $C_1 = [2\cos(t) - \cos(2t), 2\sin(t) - \sin(2t)]$ (shown in green in Figure below), where $t \in [0, 2\pi]$, and the circle $C_2 = [0.5 + 3\cos(t), 0.5 + 3\sin(t)]$, (shwon in red in Figure below), where $t \in [0, 2\pi]$. We shall find the area bounded by the following area: Start at the point B on the green curve C_1 until the point A and then follow the red curve C_2 back to the point B.*
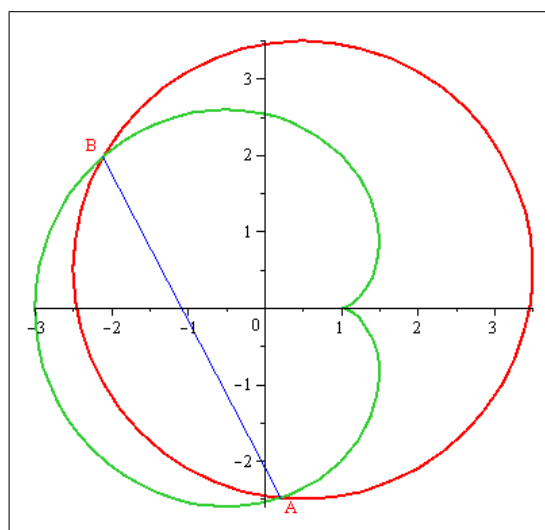

Figure. Intersection between C_1 and C_2.