Problem 15: Concentric Chase

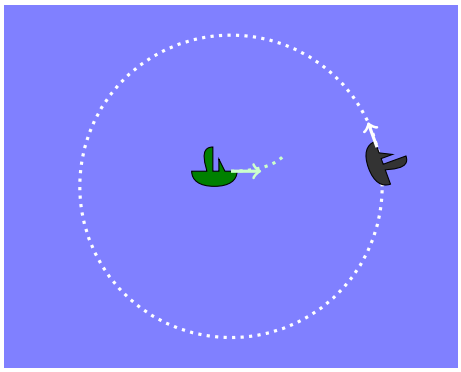
USMA D/Math Problem of the Week

Submission Deadline: March 6, 2008 at 1600

Circle one:	[cadet]	[faculty]	[non-usma student]	[non-usma faculty]	[other]

Problem Statement:

Two boats are traveling in open water in circular patterns. One boat is traveling in a circle along the parametric curve $\mathbf{x}(t) = \langle 10\cos(\pi t), 10\sin(\pi t)\rangle$ (constant speed 31.41592653589793 knots). The second boat can travel at half that speed, and *always heads exactly towards the other boat.* Find the location of the two boats when $t = 200$.



(Note: assuming that the two boats are relatively close to begin with, you do not need to know the starting location of the second boat. A numerical solution is okay, but an answer will only receive full credit with analytical proof of the asymptotic behavior of the second boat.)

This problem was inspired by my 1-year old son and a remote control Hummer.

Submit your answer to Dr. Elisha Peterson at ae3263@usma.edu with the subject line **WP POTW**... or drop your solution off in my mailbox or on my desk (with date and time please!)