Problem of the Week #24

Assigned: 1300, Thursday 07 APR 11

Due: 1300, Thursday 14 APR 11

Circular Selection

MAJ Lee Evans finally gets his "Discrete Dynamical Systems" club approved by the Directorate of Cadet Activities and decides to hold "tryouts" for the coveted position of club president. On the appointed day, x cadets arrive, each aspiring to be the DDS club president. MAJ Evans (who enjoys playing these strange games with cadets) has all those who want to be president stand in a circular formation. He walks up to the first cadet and dismisses him. Then moving counterclockwise (as is his preference), MAJ Evans orders the next cadet to "stand fast!" He then dismisses the third cadet unceremoniously, just as he did with the first, and orders the fourth to "stand fast!"

And so MAJ Evans makes his way counterclockwise, dismissing every other cadet that he comes to, around and around the circle until finally there is only one cadet remaining. This cadet is chosen to be the club president.

If you know the position of the first cadet (i.e., where MAJ Evans will start his selection process), where should you stand in the circle (as a function of x) in order to be the club president?

Email solutions to Christopher.marks@usma.edu with subject line: POTW.

Solutions can be emailed in the form of: an email (plain text) no attachment, a word document, a mathematica file, an excel workbook, or a scanned adobe file of your work.

If none of these options work for you, you may drop a hardcopy off at my office TH239C, just annotate the time of submission.