

Problem of the Month

March 2009

Starting this month, we will post a problem every month. You will have until the last date of that month to solve the problem. Solutions can be either

1. written neatly on a sheet of paper and turned in to me or Dr. Oscar Vega at my (PB 347) or his (PB 352) office (simply slide through the door or put it in the white mailbox outside Dr. Vega's office), or
2. typed up using your favorite text editing software (LaTeX preferred) and then turned in to me or him via email at asabuwala@csufresno.edu or ovega@csufresno.edu.

At the end of the month, we will review all the turned in solutions and post the names of the individuals who have turned in complete correct solutions.

Problem for March 2009

A sequence of ellipses $E_1, E_2, \dots, E_n, \dots$ is constructed as follows:

Ellipse E_n is drawn so as to touch ellipse E_{n-1} at the extremities of the major axis of E_{n-1} and to have its foci at the extremities of the minor axis of E_{n-1} .

Show that if e_n denotes the eccentricity of the n^{th} ellipse, then out of the two sequences $\{e_1, e_3, e_5, \dots\}$ and $\{e_2, e_4, e_6, \dots\}$ one is monotonic increasing and the other is monotonic decreasing and that both of them converge to $1/\tau$, where τ is the golden ratio.

Problem of the Month April 2009

You will have until the last date of April to solve the problem below. Solutions can be either

1. written neatly on a sheet of paper and dropped in the mailbox outside PB 352, or
2. typed up using your favorite text editing software (L^AT_EX preferred) and then turned in via email at either asabuwala@csufresno.edu or ovega@csufresno.edu.

At the end of the month, we will review all your solutions and post the names of the individuals who have turned in complete correct solutions, and who wrote the best* solution.

Bragging rights winners, solutions, future problems of the month, etc can be found on

http://csufresno.edu/math/news_and_events/pom.shtml

Problem for April 2009: Spring cleaning

It is Spring! It is time to start cleaning up and organize my stuff. Of course, I started with my CDs. I have lined them side by side covering the whole floor of my living room. It is a beautiful mosaic...



While I list my new musical acquisitions I realize that my pen is as long as the height of a CD case. I notice this because whenever I need to interrupt my chore I drop the pencil to the floor. After a while one more thing jumps at me: the pen sometimes hits the horizontal lines formed by the cases and sometimes it doesn't... after a while all the cleaning is long forgotten because now I am very busy trying to guess the probability of dropping my pen and hit one of the horizontal lines by throwing my pen left and right over and over again. I am getting an interesting number for this ratio. What is it?

* A solution will be considered better than other in terms of being correct, thoroughness of the explanation, beauty of the idea used, etc.