

Problem of the three weeks
December 2009

We are pleased to inform that Michael Watkins wrote the best* solution for the November 2009 Problem of the three weeks. He has won the right to brag, and be correct in any mathematical discussion** that is held in December 2009. Congratulations Michael!

We thank to all those who wrote solutions to last month's problem. We encourage you to keep submitting your solutions.

You will have until **December 18th** to solve the problem below (note the short 'month'). 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](http://csufresno.edu/math/news_and_events/pom.shtml)

Problem for December 2009.

Let α_1, α_2 and β_1, β_2 be the roots of $ax^2 + bx + c = 0$ and $px^2 + qx + r = 0$ respectively. If the system of equations $\alpha_1 y + \alpha_2 z = 0$ and $\beta_1 y + \beta_2 z = 0$ has a non-trivial solution, then prove that

$$\frac{b^2}{q^2} = \frac{ac}{pr}.$$

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

** Exams, quizzes, homework not included. Not valid where voided and with non-participating professors.