Problem of the Month
October 2012

We are pleased to announce the start of a new season of the *Problem of the Month* contest. Every month, we will post a new problem and you will have until the end of that month to solve it. Elegant solutions will be honored.

You have until **October** 31^{st} 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 (LaTeX 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 solutions and post the names of the individuals who have turned in complete correct solutions, and who wrote the best* solution.

The student who writes the best answer for this month's problem wins the right to brag, and be correct in any mathematical discussion** that is held in November 2012. Moreover, he/she will get a surprise 'math' gift!!!

Bragging rights winners, solutions, past (and future) problems of the month, etc may be found on

`http://www.fresnostate.edu/csm/math/news-and-events/pom.html`

Problem for October 2012.

Consider the sequence

$$1,\ 1,\ 2,\ 4,\ 7,\ 13,\ 24,\ 44,\ 81, \cdots$$

in which each term is the sum of the preceding three terms. If $F_{n,3}$ denotes the n^{th} term of the sequence, find

$$\lim_{n\to\infty} \frac{F_{n,3}}{F_{n-1,3}}$$

* 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.

Problem of the Month
November 2012

Unfortunately no correct solutions were submitted for the previous Problem of the Month.

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

You have until **November** 30^{th} 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 (LaTeX 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 solutions and post the names of the individuals who have turned in complete correct solutions, and who wrote the best* solution.

The student who writes the best answer for this month's problem wins the right to brag, and be correct in any mathematical discussion** that is held in December 2012. Moreover, he/she will get a surprise 'math' gift!!!

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Problem for November 2012.

The first Math Club meeting of the semester was attended by six people. Prove that there were at least three people who either all knew each other, or all did not know each other.

Would this have been true if only five people had attended the meeting?

* 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.

Problem of two weeks
December 2012

Unfortunately no correct solutions were submitted for the previous Problem of the Month.

We encourage you to keep submitting your solutions.

You have until **December** 20^{th} 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 (LaTeX preferred) and then turned in via email at either asabuwala@csufresno.edu or ovega@csufresno.edu.

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

The student who writes the best answer for this month's problem wins the right to brag, and be correct in any mathematical discussion** that is held in January 2012. Moreover, he/she will get a surprise 'math' gift!!!

Bragging rights winners, solutions, past (and future) problems of the month, etc may be found on

`http://www.fresnostate.edu/csm/math/news-and-events/pom.html`

Problem for December 2012.

Find all functions which are everywhere differentiable and that satisfy

$$f(x) + f(y) = f\left(\frac{x+y}{1-xy}\right)$$

for all x, y, for which $xy \neq 1$.

$*$ 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.

Problem of the month
February 2013

Unfortunately no correct solutions were submitted for the previous Problem of the Month.

We encourage you to keep submitting your solutions.

You have until **February** 28^{th} 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 (LaTeX 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 solutions and post the names of the individuals who have turned in complete correct solutions, and who wrote the best* solution.

The student who writes the best answer for this month's problem wins the right to brag, and be correct in any mathematical discussion** that is held in March 2013. Moreover, he/she will get a surprise 'math' gift!!!

Bragging rights winners, solutions, past (and future) problems of the month, etc may be found on

`http://www.fresnostate.edu/csm/math/news-and-events/pom.html`

Problem for February 2013.

Suppose the complex numbers z_1, z_2, z_3 represent the vertices of an equilateral triangle. Let z_0 be the circumcenter of the triangle. Prove that

$$z_1^2 + z_2^2 + z_3^2 = 3z_0^2$$

∗ 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.

Problem of the month
March 2013

We are pleased to inform that Hagop Karakazian and Ben Wright wrote the best* solutions for the February 2013 Problem of the Month. They have won the right to brag, and be correct in any mathematical discussion** that is held in March 2013. They have also won a surprise 'math' gift.
Congratulations Hagop and Ben!

We encourage all students to keep submitting solutions to the POM.

You have until **March** 31^{st} 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 (LaTeX 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 solutions and post the names of the individuals who have turned in complete correct solutions, and who wrote the best* solution.

The student who writes the best answer for this month's problem wins the right to brag, and be correct in any mathematical discussion** that is held in April 2013. Moreover, he/she will get a surprise 'math' gift!!!

Bragging rights winners, solutions, past (and future) problems of the month, etc may be found on

`http://www.fresnostate.edu/csm/math/news-and-events/pom.html`

Problem for March 2013.

Let $P_1, \cdots, P_k$ be real numbers such that $a = P_1 < P_2 < \cdots < P_{k-1} < P_k = b$. For each $i = 1, ..., k-1$ draw a semi-circle with center the midpoint of $\overline{P_i P_{i+1}}$ and passing through both P_i and P_{i+1}. What is the length of the curve created by all these semi-circles?

* 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.

Problem of the month
April-May 2013

We are pleased to inform that Cameron Khalili and Katie Urabe wrote the best* solution for the March 2013 Problem of the Month. They have won the right to brag, and be correct in any mathematical discussion** that is held over the summer. They have also won a surprise 'math' gift.
Congratulations Cameron and Katie!

We encourage all students to keep submitting solutions to the POM.

You have until **May** 18^{th} 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 (LaTeX 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 solutions and post the names of the individuals who have turned in complete correct solutions, and who wrote the best* solution.

The student who writes the best answer for this month's problem wins the right to brag, and be correct in any mathematical discussion** that is held in April 2013. Moreover, he/she will get a surprise 'math' gift!!!

Bragging rights winners, solutions, past (and future) problems of the month, etc may be found on

`http://www.fresnostate.edu/csm/math/news-and-events/pom.html`

Problem for April-May 2013.

Solve the following system of equations:

$$x^2y^2 - 2x + y^2 = 0$$
$$2x^2 - 4x + 3 + y^3 = 0$$

Use algebraic techniques only and show all steps of your solution. Graphical and/or Numerical (using a computer) solutions will not be considered correct, but could be used to devise an algebraic solution strategy.

* 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.