
May 2018 Puzzles and Problems

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| R | A | T | E |
| Y | O | U | R |
| M | A | T | H |
| P | A | L | |

Congratulations to last month's solvers: **Dalton Myers** and **Kelly Neubauer**

Problem 1: Put a row of four pennies in each cell of the grid, with the following conditions:

- (1) Every cell must have a different pattern of heads and tails (HHHH, HHTH, THTT, etc.)
- (2) Adjacent cells in the grid (horizontally and vertically) must differ by flipping a single coin. For example, HHTH may only be adjacent to THTH, HTTH, HHHH, or HHTT.

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Submit your solution using T's and H's, not actual pennies.

Problem 2: Let ABC be a triangle whose sides are 5, 12, and 13 units long. How many points are there inside the triangle for which the distance to each of the three sides is an integer (i.e., a whole number)?

Problem 3: Find all integers a , b , and c which satisfy the matrix equation

$$\begin{pmatrix} a & b \\ c & 314 \end{pmatrix}^{159} = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$$

Submit your solutions by email to Imre Tuba (ituba@gustavus.edu) or Jacob Siehler (jsiehler@gustavus.edu), or in writing to the MCS department office in Olin Hall 304, by **Thursday May 24th**.