



## Problem Set of the Week

### Problem 1 - Algebra

(★)

How many pairs of integers exist such that the sum of these two numbers is equal to their product?

### Problem 2 - Algebra

(★★)

How many pairs of real numbers exist such that the sum, quotient, and product of these two numbers are all equal?

### Problem 3 - Algebra

(★★★)

Not including pairs of numbers that are equal, how many pairs  $x$  and  $y$  of natural numbers satisfy the equation

$$x^y = y^x?$$

**Rules:** Solve one problem or solve them all. Submit solutions to Dr. Luke Grabarek in Snodgrass Hall 103A or via e-mail at [lgrabarek@matsu.alaska.edu](mailto:lgrabarek@matsu.alaska.edu). All submissions will be awarded a ★ and, in addition, correct solutions receive the ★ rating of the problem.

“Each problem that I solved became a rule which served afterwards to solve other problems.” - René Descartes