

COPIES ARE AVAILABLE IN THE MATH LIBRARY

# PROBLEM OF THE WEEK

12/1/09 due NOON 12/14/09

CAN YOU GIVE US A SOLUTION?

## Problem No. 14 (Fall 2009 Series)

A set  $F$  is called countable if either  $F$  is finite or there is a one-to-one correspondence between the elements of  $F$  and the natural numbers. Two sets  $A$  and  $B$  are called almost-disjoint if  $A \cap B$  is finite.

Prove or disprove: There are uncountably many pairwise almost-disjoint sets of natural numbers (positive integers). In more formal language: Does there exist an uncountable set  $F$  such that each element of  $F$  is a set of natural numbers and each two elements of  $F$  are almost-disjoint?

A panel in the Mathematics Department publishes a challenging problem once a week and invites college & pre-college students, faculty, and staff to submit solutions. The objective of this is to stimulate and cultivate interest in good mathematics, especially among younger students. Solutions are due within two weeks from the date of publication. They can be faxed to (765) 494-0548 or sent by campus or U.S. mail (no E-mail please) to:

PROBLEM OF THE WEEK, **8th Floor**, Math Sciences Bldg., Purdue Univ.,  
150 North University St., West Lafayette, IN 47907-2067

Solvers should include their name, address, and **status at the University or school**.

The names of those who submitted correct solutions will be posted in the Math. Library, along with the best solution. Every Purdue student who submits three or more correct solutions will receive a Certificate of Merit. A prize fund of \$300.00 will be distributed among the Purdue undergraduates who have contributed at least six correct solutions for the total Fall 2009 series.