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PROBLEM OF THE WEEK

4/10/01 **due** **NOON** 4/24/01

CAN YOU GIVE US A SOLUTION?

Problem No. 13 (Spring 2001 Series)

Let p be a prime number and let J be the set of all 2×2 matrices, $\begin{pmatrix} a & b \\ c & d \end{pmatrix}$ where $a, b, c, d \in \{0, 1, \cdots, p-1\}$, and which satisfy

$$a + b \equiv 1 \pmod{p}$$

and

$$ad - bc \equiv 0 \pmod{p}.$$

How many matrices are in J?

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 to:

PROBLEM OF THE WEEK, **8th Floor**, Math Sciences Bldg., Purdue Univ.,
West Lafayette, IN 47907

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 $150.00 will be distributed among the Purdue undergraduates who have contributed at least six correct solutions for the total spring 2001 series.