Mathematics Competition

Since no solutions were submitted for Problem #1, the date is extended to March 21. We also add a second part to the problem, in which the word "sum" is substituted with the word "product."

Part I. (Sums)

There is a 4×5 table which you want to fill with arbitrary numbers. The only restriction for filling the table is the following: the 9 sums—the 4 sums along the 4 rows and the 5 sums along the 5 columns—must be the same, S.

(a) Can these 9 sums all be equal to 10 ($S = 10$)? If YES, show an example. If NO, explain why not.

(b) Find all values of S for which the 9 sums are equal to S.

Part II. (Products)

There is a 4×5 table which you want to fill with arbitrary numbers. The only restriction for filling the table is the following: the 9 products—the 4 products along the 4 rows and the 5 products along the 5 columns—must be the same, P.

(i) Can these 9 products all be equal to 10 ($P = 10$)? If YES, show an example. If NO, explain why not.

(ii) Find all values of P for which the 9 products are equal to P.

Direct any questions to Gregory Galperin, OM 3361.

Rules and Awards

- Any undergraduate currently enrolled at EIU is eligible to participate.

- Each solution is to be the work of one individual and is to be submitted with the solver's name, year in school, email address, local address and home address.

- Each solution is to be written or typed and is due in the main Mathematics Department office (OM3611) by 2:00 p.m., Friday, March 21, 2014.

- Entries will be judged on the basis of clarity of exposition and elegance of solution.

- Up to $40 will be distributed as prize money for each problem. It will be distributed based on the quality of the solutions, but roughly, an award of $10 will be awarded for the best solutions and $5 will be awarded for partial solutions. In the case that there are many correct solutions, we will have a drawing for the prizes and in case no award is made, the prize money will be added to the next problem's prize fund.

- **Challenges, solutions, names of all solvers, and comments will be posted on the Challenge of the Week homepage:**

  http://www.eiu.edu/math/challenge.php.