

Math Weekly Problem Competition

**Friday, March 07, 2014**

Suppose  $0 < s < 1$ ,  $\alpha, \beta > 0$ , and  $\lfloor \alpha \rfloor > \lfloor \beta \rfloor$ . Let  $\psi(\alpha, \beta; s)$  be the least positive integer  $n$  such that  $\lfloor n\alpha + s \rfloor \neq \lfloor n\beta + s \rfloor$ . Find an explicit formula for  $\psi(\alpha, \beta; s)$  using the floor and ceiling functions. (The floor function  $\lfloor x \rfloor$  denotes the greatest integer  $\leq x$  and the ceiling function  $\lceil x \rceil$  denotes the least integer  $\geq x$ .)

**Join the competition!**

The Department of Applied Mathematics and IIT SIAM Student Chapter is organizing a weekly campus-wide math competition for undergraduate students.

- ▷ Every Friday 3pm, visit <http://math.iit.edu/~weeklyproblem> to view the problem of the week
- ▷ Submit the solution to [weeklyproblem@math.iit.edu](mailto:weeklyproblem@math.iit.edu) by Wednesday 5pm
- ▷ The author(s) of the first correct solution(s) will receive a monetary prize

For more details view the official web site <http://math.iit.edu/~weeklyproblem>.

Become a Math Club member and receive problem notifications by email.

Good Luck! Have fun and enjoy Mathematics!