

PROBLEM OF THE MONTH #2

APRIL 2015

Directions: Write a complete solution to the problem below showing all work. Your paper must have your name, W#, and Southeastern email address. Solutions are to be placed in the envelope for Problem #2 located in the Department of Mathematics Office, Fayard 308 by 4:30 p.m., **Wednesday, May 6**. No late papers will be accepted.

All papers with a correct solution will be entered in a drawing for a great prize!

Questions concerning the problem of the month should be sent to either Dr. Tilak de Alwis (tdealwis@selu.edu), or Dr. Randy Wills (rwills@selu.edu)

Problem: *Greatest Integer Function and Series*

For any real number x , let $[[x]]$ denote the greatest integer less than or equal to x .

(1) Find the exact value of $\sum_{n=9}^{100} \text{Cot}^2 \left(\frac{\pi}{[[\log_3 n]]} \right)$

(2) Find the exact value of $\sum_{n=9}^{100} \text{Sin} \left(\frac{n\pi}{[[\log_3 n]]} \right)$