PROBLEM OF THE MONTH #2

MARCH 2022

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 sent as a SINGLE PDF FILE to the submission address talwissubmissions@selu.edu, with the subject heading of the email as Problem of the Month #2, March 2022, by 11:59 p.m., **Thursday, March 31**. No late papers will be accepted.

All papers with a correct solution will be entered in a drawing for a great prize! Anyone can submit solutions, but only currently enrolled students are eligible for prizes.

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

PROBLEM: *All about nth Roots!*

(a) Consider the function $f(x) = \sqrt[x]{x}$ for $x > 0$. Find the exact coordinates of the local extrema of f. Provide both x and y coordinates.

(b) Let n be a natural number. Find the exact value of $\lim_{n\to\infty} \frac{n(\sqrt[n]{n} - 1)}{\ln(n)}$.

(c) Determine whether the series $\sum_{n=1}^{\infty}(\sqrt[n]{n} - 1)$ is convergent or divergent. Justify your answer.

Note: Partial answers might still be considered. So all submissions are welcome!