

PROBLEM OF THE MONTH #2

FEBRUARY 2019

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., **Thursday, February 28**. 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. Dennis Merino (dmerino@selu.edu)

Problem: *Draconian Derivatives*

For a given function $f(x)$, its derivative $f'(x)$ is defined by the following formula:

$$f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$$

(a) For the given function $f(x) = \sqrt[3]{\sin(2x)}$, where $\pi/2 \leq x \leq \pi$, ***use the above definition*** to find its derivative. DO NOT use Chain Rule and other derivatives rules to do this problem. You cannot use L'Hopital's Rule to find the limits either. Only use the methods discussed up to and including section 2.1 of your present calculus textbook.

(b) Find the exact x -coordinates of the points on the graph of $f(x)$, at which the tangent line is parallel to the line $2x - 3\sqrt[3]{6}y = 0$.