PROBLEM OF THE MONTH #2

OCTOBER 2021

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 – October 2021, by 11:59 p.m., **Friday, October 29**. 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: *Optimizing a Soccer Shot*

The two goal posts of a soccer field are located at the points $A(4,0)$ *and* $B(-4,0)$. The playing area of the field is the region defined by the quadrants III and IV.

(a) The ball is kicked from the point $Q(-5,-10)$ towards the goal. Find the approximate angle AQB in degrees (two decimal places).

(b) Suppose the striker is at a variable point P along the circle $(x-14)^2 + (y+12)^2 = 25$. We say that he has the best chance of scoring a goal when the angle APB is a maximum. Find the coordinates of P that maximizes his chances of scoring a goal. Provide the approximate (two decimal places) and the exact answers.

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