

# Cal Poly Department of Mathematics

## Puzzle of the Week

April 23 - May 7, 2015

Fix a positive constant  $c > 0$  and consider the parabola  $p$  given by  $y = cx^2$ . For any positive  $t > 0$  let  $P_t$  be the point  $(t, ct^2)$  on the parabola, and let  $\ell_t$  denote the line passing through  $P_t$  and normal to  $p$  at this point. Denote by  $f(t)$  the  $x$ -coordinate of the other point of intersection of  $\ell_t$  and  $p$  (which will lie in the second quadrant). Find the  $t > 0$  which maximizes  $f(t)$ , or show that no such  $t$  exists.

*Solutions should be submitted to Morgan Sherman:*

*Dept. of Mathematics, Cal Poly  
Email: sherman1 -AT- calpoly.edu  
Office: bldg 25 room 310*

*before the due date above. Those with correct and complete solutions will have their names listed on the puzzle's web site (see below) as well as in next week's email announcement. Anybody is welcome to make a submission.*

<http://www.calpoly.edu/~sherman1/puzzleoftheweek>