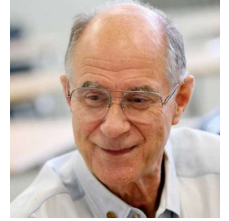


Name _____ Date _____ Period _____

Worksheet 000A.01—Slide Problem Day 1

You will need a calculator for this problem (waterproof is preferred but not required)

This problem is adapted from the great Paul Foerster, who, over 50 years, taught over 6000 students at Alamo Heights High School in San Antonio.



Slide Problem. Phoebe Small sits atop a swimming pool slide. At $t = 0$, she pushes off. Calvin Butterball, who stands mathematically at the bottom of the slide, finds her velocity, $v(t)$, in feet per second, is given by $v(t) = 10\sin(0.3t)$. Phoebe splashes into the water at $t = 4$ seconds, getting water on Calvin's calculator (which is, of course, waterproof).



(a) Sketch the graph of Phoebe's velocity as she slides towards the water. Label your axes and determine a suitable domain and range for $v(t)$.

(b) At what time did Phoebe hit the water? How fast was Phoebe traveling at this time (Calculator in radian mode, 3 decimal accuracy)?

- (c) What "rate" was her speed changing at $t = 3$? (use $t = 3.0001$ and $t = 3.0000$). Show the work that leads to your answer.
- (d) What special name is given to rate of change of speed?
- (e) Give an estimate for the length of the slide.
- (f) Are Phoebe and Calvin having fun? Are you?