

Meeting: 1003, Atlanta, Georgia, MAA CP R1, MAA Session on My Three Favorite Original Calculus Problems

1003-R1-710 **G. Elton Graves*** (g.e.graves@rose-hulman.edu), Rose-Hulman Institute of Technology, CM 131, 5500 Wabash Ave., Terre Haute, IN 47803. *Putting it all Together.*

In this paper we will discuss three problems, two from Calculus I and one from Calculus III (multivariate calculus). In the first problem the students are asked to model the path of a spacecraft that is to rendezvous with a spacestation which is moving along a given implicit path. The students need to use the concepts of slope and concavity for both functions of the form $y=f(x)$, and $f(x,y)=c$.

The second problem is a max/min problem which asks the students to find how close a moving spacecraft will come to a moving comet. Since the path of the spacecraft and comet are given as parametric equations, students can use the distance formula to find a distance as a function of time. The student then applies the use of computer graphics and max/min theory to determine when the spacecraft is closest to the comet.

The third problem comes from an amusement park ride where the passengers go through a loop. The loop is given by parametric equations and the students are asked to find the minimum constant speed that will allow the loop to be completed without the passengers falling out. (Received September 28, 2004)