1163-J5-1074 **James S Sochacki*** (sochacjs@jmu.edu), sochacjs@jmu.edu. *Exploring Differential Equations with Exponents and Delays.*

I learned differential equations from the 3rd edition of Differential Equations and Boundary Value Problems by Boyce & DiPrima and an energetic professor in 1977. From that point on, I knew I would study differential equations and modeling. Three problems in this book caught my attention as a student: (1) $x' = x^{\frac{1}{3}}$ (2) $x' = x^2$ and (3) the rocket problem. In this talk, I will discuss the generic differential equation: $x' = x^r$ and a rocket chasing a planet (or a dog chasing a rabbit). For the former, I will discuss properties for real numbers r and questions of inquiry that I give my students related to this problem and the latter will be the discovery that two students made for an NSF-REU summer. There will be computer generated figures and animations. (Received September 14, 2020)