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Judy A Holdener* (holdenerj@kenyon.edu). *Perfect Numbers, Descartes Numbers, and Deficient Perfect Numbers.*

In a 1638 letter to Marin Mersenne, René Descartes reported his discovery of the odd “spoof perfect number” $198,585,576,189 = 3^2 7^2 11^2 13^2 (22021) = 3^2 7^2 11^2 13^2 (19^2 61)$, which would be an odd perfect number if only 22021 were prime. A number such as this is now known as a *Descartes number*, and at first glance this perfect spin-off might appear to be a curious fluke. However, a closer look reveals that Descartes did not happen upon this number by chance. In this talk we demonstrate that Descartes’ discovery follows naturally from examining the structure of odd perfect numbers. In particular, we prove that every perfect number has a deficient perfect divisor, and one is certain to stumble upon Descartes’ well-known number while examining deficient perfect numbers. In the interest of full disclosure, our approach does rely on the use of a computer, which is something that Descartes did not have! (Received January 14, 2020)