1145-VS-2415 **Jeremy Nathan Glasner*** (glasnerjn@jay.washjeff.edu). *Circles and Squares: A Look at Gauss's Circle Problem.*

Some natural numbers can be represented as the sum of two squares of the form $n = a^2 + b^2$ for $a, b \in \mathbb{Z}$. For example, $5 = 2^2 + 1^2$ whereas 3 cannot be represented as the sum of two squares. Let $r(n)$ be the number of ordered representations of n and let $N_2(n) = \sum_{k=0}^{n} r(k)$. Gauss showed that $\lim_{n\to\infty} \frac{N_2(n)}{n} = \pi$. This presentation will go over some properties of these representations in respect to number theory as well as a geometric proof of Gauss's problem. Additionally, we will see current research on reducing the error associated with this proof as well as extensions of this problem into three dimensions. (Received September 25, 2018)