

EKU Mathematics Colloquium
Professor Doug Iannucci

11:15 – 12:05, October 28, Wallace 431

A family of weird numbers

We say a positive integer n is *weird* if it is abundant, but not pseudoperfect. We say n is abundant if $\sigma(n) > 2n$, where σ denotes the sum-of-divisors function given by

$$\sigma(n) = \sum_{d|n} d.$$

An abundant number n is pseudoperfect if we can choose a subset of aliquot parts of n (*i.e.*, divisors of n that are less than n) which add up exactly to n . Thus we see that 30 is pseudoperfect since, say, $10+15+5 = 30$, but 70 is weird because no subset among the aliquot parts 1, 2, 5, 7, 10, 14, or 35 can be chosen that sum to 70. The simplest form a weird number can have is $2^k pq$, where $p < q$ are odd primes. In this talk we obtain an algorithm for finding all such weird numbers for each fixed value of k . We also see how to find the largest known weird numbers of this form, which involves a Lucas type primality test.