UW Math Circle

April 23, 2015

Homework

1. Find $\gcd(12n + 1, 30n + 2)$.

2. Find the last digit of $1^2 + 2^2 + 3^2 + \cdots + 99^2$.

3. For a number n, can the number $n!$ have exactly 5 zeros at the end of its decimal representation?

4. Find $\gcd(111\ldots111, 11\ldots11)$, where there are 100 1's in the first number and 60 1's in the second.

5. If p and $p^2 + 2$ are prime numbers, show that $p^3 + 2$ is also a prime number.