

UW Math Circle
April 23, 2015

1. Prove that the product of any five consecutive numbers is divisible by 120.
2. Show that the fraction $\frac{2n + 13}{n + 7}$ cannot be reduced for any natural number n .
3. What is the last digit of 2014^{2015} ?
4. If a and b are integers that satisfy the equation $56a = 65b$, prove that $a + b$ is composite.
5. Can the sum of two perfect squares be another perfect square? Can the sum of three squares of positive odd numbers be a perfect square?
6. If p is a prime number such that $8p^2 + 1$ is also prime, what is p ?



7. Challenge: If $n = \frac{a}{b}$ for integers a and b , prove that the decimal representation of n either terminates or eventually repeats.