

UW Math Circle  
February 14, 2013

1. What is  $3^{50} \pmod{7}$ ?
2. Is it possible for the number  $77 \cdots 7772$  to be a perfect square?
3. Show that  $3^{6n} - 2^{6n}$  is divisible by 35 for any positive integer  $n$ .
4. If  $p$  is a prime number, show that  $(a + b)^p \equiv a^p + b^p \pmod{p}$ .