

North Dakota Mathematics Talent Search 2008-2009
Problem Set 1
Problems due December 15th, 2008

1. A three digit number is divisible by 77 and all of its digits are even numbers. Find this number.
2. Is the number $\frac{99^{99} + 100^{100}}{99^{100} + 100^{99}}$ greater than 1 ?
3. Consider a disk of radius 1 and choose 7 distinct points in the disk such that the distance between any two points is at least 1. Show that the center of the disk must be one of the 7 points.
4. The sum of the digits of a positive integer is 1985. Can this number be a perfect square?
5. Find the smallest positive integer of the form $5^a - 11^b$ where a, b are positive integers.