MATH 290 – 17 JUNE 2009 – EXAM 2

Answer all of the following questions on the answer sheets provided. Show all work, as partial credit may be given. Each problem is worth 10 points.

1. Prove that there exists a positive integer m less than 100 such that the sum of its digits is 17 and the product of its digits is 72.

2. Prove that every point on the line $x + y = 2$ lies outside the circle with radius 1 centered at the origin.

3. Let x and y be integers. Prove the following by contraposition: If xy is odd then x is odd or y is odd.

4. Let $k > 1$ be an integer. Use proof by contradiction to show that k cannot divide $k + 1$.

5. Let n be an integer. Prove that n^3 is even if and only if n is even.