Howard University Math Department

Homework 2 (16 points)

1. Prove or disprove by counterexample: Given that the first n prime numbers are $p_1, p_2, p_3, ..., p_n$ the number $P_n = (p_1 \times p_2 \times ... \times p_n) + 1$ is also a prime.

   (For example, $2 \times 3 + 1 = 7, 2 \times 3 \times 5 + 1 = 31$ are both primes. Is this always true?)

2. Write the negative, converse and contrapositive of the following statement:

   Statement A: If the product of three positive real numbers is ≥ 27, at least one of them is ≥ 3.

3. Prove statement A using proof by contrapositive.

4. Is the converse of statement A true? Prove it is true or prove that it is not true (disprove).