

Worksheet # 1

MATH 294 ESP Workshop

Spring 2016

Problem 1. Prove or disprove: For every real number x ,

$$|x - 1| + |x + 5| \geq 6.$$

Problem 2. Prove or disprove: For all natural numbers n ,

$$3n^2 + 3n + 23$$

is prime.

Problem 3. Consider the five statements:

- (P_1) I like pineapple on my pizza.
- (P_2) All odd-numbered statements are false.
- (P_3) All even-numbered statements are true.
- (P_4) At least one of P_2 or P_3 is true.
- (P_5) If P_1 is false then P_2 is true.

Some of these statements refer to other statements on the list. Notice, if P_3 is true then all even-numbered statements must be true, and so P_2 must be true. Now, the truth of P_2 implies all odd-numbered statements are false, and so P_3 is false. So if P_3 is true then it must also be false. This contradiction means P_3 must not be true.

Can you assign the truth values *true* and *false* to each of the above five statements so that there are no contradictions?
