CSCI 301, Winter 2018
Math Exercises # 3

YOUR NAME HERE

Due date: Tuesday, February 6, midnight.

Prove each of the following statements twice, using two different methods. Choose among direct, contrapositive, and contradiction. You are free to choose which two to use. Explicitly note on each proof which method you are using, and be explicit about the logical form of your proposition, its constituent propositions, and any negations you make.

1. If two integers have the same parity, then their sum is even.

   First proof, method:

   Second proof, method:

2. Suppose $a \in \mathbb{Z}$. If a^2 is not divisible by 4, then a is odd.

   First proof, method:

   Second proof, method:

3. Suppose $a, b \in \mathbb{Z}$. If $4 \mid (a^2 + b^2)$, then a and b are not both odd.

   First proof, method:

   Second proof, method:

4. Suppose $a, b, c \in \mathbb{Z}$. If $a^2 + b^2 = c^2$ then a or b is even.

   First proof, method:

   Second proof, method: