Name: ———————————————————

Time of your discussion section: ————————————

CS311: Discrete Math for Computer Science, Spring 2015

Homework Assignment 1, Due January 30

1. Simplify the given formulas.

(a) $n > 4 \wedge n < 6$.

(b) $x > 3 \vee x < 3$.

(c) $\neg(x > 10)$.

2. Determine whether the given formula is true or false. If it is true then find a witness:

(a) $\exists x(2x^2 + 3x + 1 < 0)$.

(b) $\exists xy(2x + y = 5 \wedge x + 2y = 6 \wedge x < y)$.

(c) $\exists mn(m^2 + n^2 = 6)$.

3. Determine whether the given formula is true or false. If it is false then find a counterexample:

(a) $\forall n(2^n > 1 \vee n < 0)$.

(b) $\forall n \left(n^2 > 2^{-\frac{1}{2}}\right)$.

(c) $\forall xy(x^2 + y^2 = x^3 + y^3)$.

4. Translate into logical notation:

There exists a pair of negative integers such that their product is 6.

Find a witness showing that this assertion is true.