Introduction to Abstract Mathematics
Fall 2018

Assignment 1.1
Due August 29

Exercise 1. Determine the prime constituents of each of the following statements, and use them to express these statements symbolically.

a. If I am tired or hungry, then I cannot study.

b. If it is foggy tonight, then either John must take a taxi or he can't go out.

c. If the Pirates or the Cubs lose and the Giants win, then the Dodgers will be out of first place and, furthermore, I will lose a bet.

d. The sum of two odd integers is even. [*Hint:* This is an implication.]

Exercise 2. Repeat the preceding exercise with the following statements.

a. Alice and Bob are not both in the room.

b. Alice and Bob are both not in the room.

c. Either Alice or Bob is in the room.

d. Neither Alice nor Bob is in the room.

e. Either Alice or Bob is in the room, but not both.

Exercise 3. Let S stand for the statement "Steve is happy" and G for "George is happy." What (meaningful!) English sentences are represented by the following expressions? If you think carefully, you'll find that there's considerable "cancellation" in parts **b** and **c**.

a. $(S \vee G) \wedge (\neg S \vee \neg G)$

b. $[S \vee (G \wedge \neg S)] \vee \neg G$

c. $S \vee [G \wedge (\neg S \vee \neg G)]$