Names ____

Problem 2

1. Construct a truth table for $p \wedge (p \Rightarrow q) \Rightarrow q$.

2. Construct a truth table for $(p \Leftrightarrow q) \wedge (p \oplus q)$.

Problem 3

(a) Write each sentence as a fully quantified expression by defining appropriate sets and predicates. Then, write an English sentence that expresses the logical *negation* of the sentence. If a sentence is ambiguous in its meaning, describe all of the interpretations of the sentence that you can find, and then choose one and give its fully quantified expression and logical negation (in English).

- Every decent programming languages denotes block structure with parentheses or braces.
- There exists an odd number that is evenly divisible by a different odd number.

(b) Draw the Venn diagram of the set $(A - B) \cap C$.

Problem 4

Fill in the rest of the proof by contrapositive of the following claim.

Claim. If $|x| + |y| \neq |x + y|$, then $xy < 0$.

Proof. We prove the contrapositive. That is, if ________________, then ________________.

Suppose ________________. We want to show ________________.

We prove using cases.

Case 1: $x, y \geq 0$.

statement	reasoning