Name _____ Period _____ Logic and Computation

Boolean Algebra and Truth Tables Study Guide

Skills and Concepts:

- Be able to simplify Boolean algebra expressions.
- Be able to translate an English sentence into symbolic logic.
- Be able to create a truth table and interpret the conditions in which a proposition is true.
- Be able to determine whether two expressions are logically equivalent using a truth table.

Practice Problems:

Simplify the following Boolean expressions until you arrive at either 0 or 1. Show your work.

1. $(\neg 1 \vee 1) \rightarrow \neg\big(0 \rightarrow \neg(1 \wedge 0)\big)$

2. $\neg\big((1 \wedge 0) \vee 0\big) \rightarrow \big(1 \rightarrow (1 \rightarrow 0)\big)$

3. Use truth tables to show that these logical expressions are equivalent to one another: $P \rightarrow Q \equiv \neg Q \rightarrow \neg P$.

Translate the following sentences to symbolic form.

4. If you are a pirate or a samurai, then you are a warrior.

5. You are not my friend if you are mean or selfish.

6. If the sky is blue, then it is daytime, provided that you live on Earth.

7. You are a wizard only if you can cast magic and wear a pointy hat.

8. Complete a truth table for the following logical expression:

$$\neg P \rightarrow (Q \wedge \neg R)$$

P	Q	R	
1	1	1	
1	1	0	
1	0	1	
1	0	0	
0	1	1	
0	1	0	
0	0	1	
0	0	0	