Mathematical Methods for Philosophy:
In-Class Exercises 15/10/2013

Exercise 1: Write the following sentences as formulas of propositional logic.

1. If Mary works harder, then she will get a good grade.

2. Although Jim ran as fast as he could, he was still too slow.

3. Only good dogs go to heaven.

4. Either Suzy or Jane ate the last slice of pizza.

5. Not all Americans are obese.

Exercise 2: Draw the parse tree for the following formula and whether they are true when p is true, q is false, r is true, s is false, and t is true.

- $((p \lor q) \to ((r \to s)\&t))$

- $(\neg(\neg p\&q)\& (s \to (r \lor t)))$

Exercise 3: Using truth tables, decide whether each of the following three formula is a tautology, contradiction, or a contingent formula.

- $(p \to (\neg p \to q))$

- $\neg ((p \to q) \lor (q \to p))$

- $(p \lor \neg p) \to q$

Exercise 4: Using a truth-tree, find a counterexample to the following two arguments:

Argument 1	Argument 2
$p \to q$	$p \to (q \lor r)$
$\neg p \to \neg q$	$p \to q$

Exercise 5: Pick a tautology on this page, and using a truth-tree, confirm it is a tautology.