Math 55: Homework 1
Due Wednesday, June 24

1. Let p, q, and r be the propositions "we have flint," "we have matches," and "we can make a fire," respectively. Write out the following statements using p, q, r and logical connectives:

   (a) If we have flint or matches, we can make a fire.

   (b) If we do not have flint, then we can make a fire if and only if we have matches.

2. Show via a truth table that "((p or q) and (not p)) $\Rightarrow$ q" is a tautology.

3. Using DeMorgan's Laws when appropriate, find the inverse, converse, and contrapositive of the following proposition: "If a number n is even and it is divisible by 3 then it is divisible by 6."

4. Either the Warriors or the Cavaliers will win the championship, but not both. Curly will be happy if the Cavaliers win. Larry will be happy if the Warriors win. Show that the following conclusions are valid, citing the rules of inference used:

   (a) Either Larry or Curly will be happy.

   (b) If Curly will not be happy, then Larry will be happy.