Name: _____

Math 283 Spring 2012
Assignment 2
Due Monday, January 30

To Hand In:

D'Angelo & West Ch. 2: 2, 10 (a, b & g only), 38, 44, 48

Not To Hand In:

D'Angelo & West Ch. 2: 3, 4, 6, 9, 11, 21, 31

Extra Problems

1. Consider the statement "If $x > 1$, then $x^2 > 1$."
   (a) State the converse, contrapositive and negation.

   (b) The first statement is clearly true. What about the other three statements you just wrote?

2. Which of the following are true? The universe for each is given in parentheses.
   (a) $\forall x(x + x \geq x)$ (real numbers)

   (b) $\exists x(2x + 3 = 6x + 7)$ (natural numbers)

   (c) $\exists x(3^x = x^2)$ (real numbers)

   (d) $\forall x(x^2 + 6x + 5 \geq 0)$ (real numbers)

   (e) $\exists x(x^2 + x + 41$ is prime) (natural numbers)

   (f) $\forall x(x^2 + x + 41$ is prime) (natural numbers)

   (g) $\forall x(x^3 + 17x^2 + 6x + 100 \geq 0)$ (real numbers)

3. Prove by contradiction that if n is a natural number, then
$$\frac{n}{n+1} > \frac{n}{n+2}.$$

4. Make truth tables for these propositional forms.
   (a) $(P \vee Q) \implies (P \wedge Q)$

   (b) $[(P \wedge Q) \vee (Q \wedge R)] \implies P \vee R$