

## Math 260

Quiz #2, due Friday, April 5

Be sure to show your pertinent work!

1. Suppose the truth table for  $p \xrightarrow{w} q$  (“weird” conditional) is given by the following:

| $p$ | $q$ | $p \xrightarrow{w} q$ |
|-----|-----|-----------------------|
| T   | T   | T                     |
| T   | F   | F                     |
| F   | T   | <b>F</b>              |
| F   | F   | T                     |

Is  $[(p \xrightarrow{w} q) \wedge (q \xrightarrow{w} r)] \xrightarrow{w} (p \xrightarrow{w} r)$  a tautology? Why or why not?

2. Give an “everyday” example of statements  $p$  and  $q$  for which  $p \rightarrow q$  and  $q \rightarrow p$  are **CLEARLY** different.

3. For each of the following statements, determine the truth value, being sure to explain your answer.

(a) “If 6 is prime, then 11 is prime”.

(b) “9 is prime, or 4 is prime”.

4. Determine the truth value of the statement  $4 \in \{x \in \mathbb{Z}^+ \mid \text{if } x \text{ is prime, then } 3 = 1\}$ .

5. Using logical equivalencies, show that  $p \rightarrow (q \rightarrow r) \equiv (p \wedge q) \rightarrow r$ . Be sure to justify your steps!