

Math 174, Fall 2003, Solution to Quiz 2

**Question:** Is the argument

$$\begin{array}{l} p \rightarrow q \\ q \rightarrow p \\ \therefore p \vee q \end{array}$$

valid? Justify your answer. (You will probably want to use a truth table.)

**Answer:** Here is the truth table:

| $p$ | $q$ | $p \rightarrow q$ | $q \rightarrow p$ | $p \vee q$ |   |
|-----|-----|-------------------|-------------------|------------|---|
| $T$ | $T$ | $T$               | $T$               | $T$        |   |
| $T$ | $F$ | $F$               | $T$               | $T$        |   |
| $F$ | $T$ | $T$               | $F$               | $T$        |   |
| $F$ | $F$ | $T$               | $T$               | $F$        | ★ |

All the hypotheses are True in rows 1 and 4. However, in row 4, the conclusion is False. This argument is NOT valid.