

**Class Problem**  
**Math 2513**  
**Tuesday, June 14**

PROBLEM. Let  $p$  and  $q$  be the propositions "The election is decided" and "The votes have been counted", respectively. Express each of the following propositions as an English sentence.

- (a)  $\neg p$
- (b)  $\neg p \wedge q$
- (c)  $\neg q \rightarrow \neg p$
- (d)  $\neg q \vee (\neg p \wedge q)$

ANSWERS:

- (a) The election is not decided.
- (b) The election is not decided and the votes have been counted.
- (c) If the votes have not been counted then the election is not decided.
- (d) The votes have not been counted, or, the votes have been counted but the election is not decided.