

Math 174, Fall 2003, Solution to Quiz 5

Problem: Let $A = \{t, u, v, w\}$ and let S_1 be the set of all subsets of A that do not contain w and S_2 the set of all subsets of A that do contain w .

- (a) Find S_1 .
- (b) Find S_2 .
- (c) Are S_1 and S_2 disjoint?
- (d) Compare the sizes of S_1 and S_2 .
- (e) How many elements are in $S_1 \cup S_2$?
- (f) What is the relation between $S_1 \cup S_2$ and $\mathcal{P}(A)$?

Answer:

- (a) The elements of S_1 are: $\emptyset, \{t\}, \{u\}, \{v\}, \{t, u\}, \{t, v\}, \{u, v\}, \{t, u, v\}$.
- (b) The elements of S_2 are: $\{w\}, \{t, w\}, \{u, w\}, \{v, w\}, \{t, u, w\}, \{t, v, w\}, \{u, v, w\}, \{t, u, v, w\}$.
- (c) Yes, the sets S_1 and S_2 ARE disjoint.
- (d) The sets S_1 and S_2 each have 8 elements.
- (e) The set $S_1 \cup S_2$ has 16 elements.
- (f) The sets $S_1 \cup S_2$ and $\mathcal{P}(A)$ are equal.