

**If  $A$  is a set, define the *power set* of  $A$  by  $P(A) = \{S \mid S \subset A\}$**

1. List elements of  $P(A)$  for  $A = \{a\}$ ,  $A = \{a, b\}$ ,  $A = \{a, b, c\}$ , and  $A = \emptyset$
2. Make conjecture about cardinality of  $P(A)$  if  $A$  is finite
3. Prove your conjecture
4. Any thoughts on the cardinality of  $P(A)$  if  $A$  is an infinite set?