

**MAT 129**  
**Lab #07**  
**26 February 2007**

- (1) Let  $S = 1, 2, 3, \dots, 29, 30$ . How many subsets of  $S$  satisfy
- a.)  $|S| = 5$ ?
  - b.)  $|S| = 5$  and the smallest element of  $S$  is 5?
  - c.)  $|S| = 5$  and the smallest element of  $S$  is less than 5?
- (2) Let  $S$  be a set containing  $n$  elements where  $n$  is a positive integer. How many ways are there to partition  $S$  into two subsets?
- (3) Let  $S = \{a, b, c, d\}$ .
- a.) How many relations are there on  $S$ ?
  - b.) Give an example of a relation on  $S$  that is not reflexive.
  - c.) How many reflexive relations are there on  $S$ ?
  - d.) How many equivalence relations are there on  $S$ ?
- (4) How many 3 element subsets of  $S = 1, 2, 3, \dots, 11$  contain no odd number?
- (5) Sally has  $N$  friends and likes to invite them over in small groups for dinner. She calculated that she can invite a different group of 3 friends to dinner at her house every night for an entire year. What is the minimum number of friends Sally can have?