
CompSci 102 Discrete Mathematics for CS
Spring 2005 Forbes In-class Questions 4

1. Prove that a knight starting at $(0,0)$ can visit every square on the unbounded negative quadrant.

Sum and Product Rule

2. At University X, there are 19 CS majors, 17 math majors, 11 Poli Sci majors, and 8 Econ majors. Having multiple majors is not allowed at X.
 - (a) How many ways are there to choose someone who is either a CS major or a math major?
 - (b) The total number of students at X is?
 - (c) How many different ways are there to pick four students with different majors from among the students at University X?
3. How many ways are there to deal a 5-card sequence from a 52 card poker deck?
4. How many ways are there to select an ordered pair of numbers from 1 to 7 (repetition allowed) so that the sum is even? Think of it as counting black squares on a checkerboard. (Why?)

Division Rule

5. Suppose that 800 pieces of candy are to be sold 50 pieces to a box. How many boxes are required?
6. How many ways are there to 2-color a 2-by-2 checkerboard? How many equivalence classes are there under reflection and rotation?

Inclusion-Exclusion

- Count the number of bit-strings of length 8 that have either 1 as a prefix or 00 as a suffix

Tree Diagrams

- Count the subsets of 2, 5, 11, 17, 23 whose sum is at most 29.