

Counting: Problems Involving "Not" and "Or"

1. You toss 6 fair coins.
 - (a) How many possible outcomes are there? 2^6
 - (b) How many ways are there to obtain atleast 2 heads? 57
 - (c) How many ways are there to obtain atleast 1 heads and atleast 1 tails? 62
2. You draw a single card from a standard deck of 52 cards.
 - (a) How many ways are there to obtain a face card? 12
 - (b) How many ways are there to obtain a spade? 13
 - (c) How many ways are there to obtain a spade and a face card? 3
 - (d) How many ways are there to obtain a spade or a face card? 22
3. You draw a hand of 3 cards from a standard deck of 52 cards. (You may move them around in your hand.)
 - (a) How many ways are there to obtain atleast 1 heart? ${}_{52}C_3 - {}_{39}C_3 = 12961$
 - (b) How many ways are there to obtain a heart and a diamond? $2({}_{13}C_2 \cdot 13) + 13 \cdot 13 \cdot 26 = 6422$
4. Joe has 9 assignments to complete for school this week. Two of them involve writing essays. Joe will work on two of the assignments tonight. How many different choices of two would include at least one essay assignment? 15
5. If license plates consist of two letters followed by three digits, how many different plates can be created having atleast one digit or letter repeated? 208000
6. Twenty-five students competed in a national business competition. Two of those students are from UH Manoa. The judges will be giving away 3 scholarships to some of the students. How many ways could the judges choose the winners so that atleast one of the students from UH Manoa would be given a scholarship? ${}_{25}C_3 - {}_{23}C_3 = 529$