

CSE 21: Quiz 1 Solutions

April 14, 2006

1. How many ways are there to pick 2 different cards from a standard 52-card deck such that the first card is a spade or diamond, and the second card is not a King? **Ans:** We break into two cases – the first card is the King of Spades or the King of Diamonds, and when the first card is NOT the King of Spades and King of Diamonds. Case 1: 1st card is Ks or Kd – There are 2 ways to pick from $\{Ks, Kd\}$ as our first choice and then 48 non-kings left in the deck as our second choice giving us $2 \cdot 48$. Case 2: 1st card is NOT Ks or Kd – There are 24 choices of non-king spades or diamonds as the 1st choice and then 47 non-kings left to choose from giving us $24 \cdot 47$. Summing up the two cases gives **FINAL ANS:** $2 \cdot 48 + 24 \cdot 47$.
2. How many ways can a committee be formed from five men and seven women with three members, at least two of whom are women, and Mr. and Mrs. Baggins cannot both be chosen? **Ans:** There are two cases: we have all women in the committee, or we have 2 women and one man. Case 1: All women – here we don't have to worry about Mr. and Mrs. baggins being chosen together and we get $\binom{7}{3}$. Case 2: 2 women, 1 man – Here we use the subtraction method and realize that there are $\binom{7}{2}\binom{5}{1}$ total ways to pick a committee with 2 women and 1 man. Moreover, there are $\binom{6}{1}$ ways to pick a committee that includes Mr. and Mrs. Baggins since we first put Mr. and Mrs. Baggins in the committee and then have 6 other women to choose 1 from. This gives a total for case 2 of $\binom{7}{2}\binom{5}{1} - \binom{6}{1}$. Summing the two cases up gives **FINAL ANS:** $\binom{7}{3} + [\binom{7}{2}\binom{5}{1} - \binom{6}{1}]$.