## *Poker hand consists of 5 cards selected from a deck of 52 cards.*

- How many different poker hands are there?
  C(52,5) = 2598960 hands ({1,2,3,4,5} = {5,3,4,2,1})

- How many different poker hands consist entirely of aces and kings?
  Number of aces + kings = 8; C(8,5) = 56 hands.

- How many different poker hands consist entirely of clubs? # of clubs = 13, C(13,5) = 1287 hands.

- How many consist of 3 aces and 2 kings? C(4,3).C(4,2) = 4.6 = 24

- How many different poker hands consist entirely of red cards?
  # red cards = 26; C(26,5) = 65780 hands.

- How many combinations have cards from exactly 2 suits?
  a)Consider one from the 1st suit, then there are C(4,1) = 4, and left 4 for the other suit then there are C(3,1) = 3. Therefore there are 4.C(13,1) . 3C(13,4) = 111540 ways.
  b) Consider 2 from the 1st suit, then there are C(4,1) = 4, and left 3 for the other suit then there are C(3,1) = 3. Therefore there are 4.C(13,2) . 3C(13,3) = 267696 ways
  c)Total = 111540 + 267696 = 379236 ways

- How many ways all the cards from the same suit?
  Select a suit, there are C(4,1) = 4 ways to do this. For each selection of a suit there are C(13,5) = 1287.
  Final = 4. C(13,5) = 5148 ways.



- How many ways 3 from one suit and 2 from another?
  Select a suit there are C(4,1) = 4 ways to do this. The other suit is C(3,1) = 3 (since 3 suits left to choose from). First 3 from 1 suit there are 4.C(13,3) = 286 ways, and 2 from another 3.C(13,2) = 78.
  Total = 4.C(13,3) . 3C(13,2) = 22308 ways.

- How many ways 2 aces, 2 cards of another denomination, and 1 card of a 3rd denomination.
  - For 2 aces = C(4,2) = 6
  - 2 cards of another denomination are C(4,2) = 6 ways, there are 12 ways for the 2nd denomination.
    Therefore, there are 12.(6) = 72 ways
  - 3rd denomination the are 11 ways, 1 card $\Rightarrow$ 11.C(4,1) = 44
    The outcomes: 6.(72).(44) = 19008 hands.

- How many hands are in 2 cards of 1 denomination, 2 cards of another different denomination, and 1 card of a 3rd denomination.

  Select 2 cards of 1 denomination = C(13,2) = 78 ways.
  Select 2 of one denomination, there are C(4,2) = 6
  Then select 2 of the other = C(4,2) = 6
  Select the 3rd denomination, there are 11.C(4,1) = 44
  # of poker hands = 78.6.6.44 = 123552 hands.