

Homework #12 Solutions

Problems

How many possible 5-card poker hands from a standard deck are there with 3-of-a-kind (3 cards of the same rank and 2 additional cards). You must NOT count 4-of-a-kind and full-house hands. Thus the 2 additional cards cannot match your 3-of-kind nor can they be a pair. For full credit, you must explain each task in your procedure; simply stating an answer receives no credit.

1. Select a rank for the 3-of-a-kind: $C(13, 1)$
2. Select three cards from the selected rank: $C(4, 3)$
3. Select two other ranks for the two remaining cards: $C(12, 2)$
4. Select one card from the rank for the fourth card: $C(4, 1)$
5. Select one card from the rank for the fifth card: $C(4, 1)$

$$\begin{aligned}\text{Total number of ways} &= C(13, 1)C(4, 3)C(12, 2)C(4, 1)C(4, 1) \\ &= 13 \cdot 4 \cdot \frac{12!}{10!2!} \cdot 4 \cdot 4 \\ &= 13 \cdot 4 \cdot \frac{12 \cdot 11}{2} \cdot 4 \cdot 4 \\ &= 13 \cdot 4 \cdot 66 \cdot 4 \cdot 4 \\ &= 54912\end{aligned}$$