Conditions

determine the number of 5 cards combination out of 52 cards if each selection of 5 cards has exactly one king

Solution

There are 4 kings in a deck of 52 cards. For each of 4 kings, we must calculate the number of combinations of 4 cards (5 cards minus one king) from a set of 48 cards (52 cards minus fixed king minus 3 other kings). The formula of such combination is below:

$$C_{48}^4 = \frac{48!}{4!\,44!} = \frac{45 \cdot 46 \cdot 47 \cdot 48}{1 \cdot 2 \cdot 3 \cdot 4} = 194580$$

As we have this number for all 4 kings, the answer is:

$$194580 \cdot 4 = 778320$$

Answer: 778320