N = 2 \cdot 2 \cdot 5!

9.

Remove spades, leaving 52 - 13 = 39 cards in deck.

Sample card hand

\[
\begin{array}{cccc}
\text{Heart} & \text{2} & \text{3} & - & 10 \\
\text{Diamond} & \text{A} & \text{2} & \cdot & \text{5} \\
\text{Spade} & \text{A} & \text{2} & \cdot & \text{5} \\
\text{Club} & \text{2} & \cdot & \text{5} & \cdot \\
\end{array}
\]

Note: 2 \cdot 2 \cdot 5 = 33 choices.

Process:
1. Pick two denominations for two pairs (here I chose 2\text{\textcolor{red}{\textbullet}}\text{\textcolor{red}{\textbullet}} and A\text{\textcolor{red}{\textbullet}}\text{\textcolor{red}{\textbullet}}) \binom{13}{2}
2. Pick two aces from 3 = \binom{3}{2}. This eliminates all Aces = 39 - 3 = 36 cards left in deck.
3. Pick two 2\text{\textcolor{red}{\textbullet}} from 3 available \binom{3}{2}. This eliminates all 2\text{\textcolor{red}{\textbullet}} leaving 36 - 3 = 33 cards in deck.

\textbf{Step 4} Pick one card from the 33 remaining cards, \binom{33}{2} choices.

\[
P = \frac{\binom{13}{2} \cdot \binom{5}{2} \cdot \binom{3}{2} \cdot 33}{\binom{32}{5}}
\]

Note: Can also use \binom{32}{5} from \binom{\text{11}}{3} = 11 \cdot 8 = 88.