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$A - B = \{6, 8, 10\}$.

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$A^c = \{1, 3, 5, 7, 9\}$.

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$\{1H, 2H, 3H, 4H, 5H, 6H, 1T, 2T, 3T, 4T, 5T, 6T\}$.

What is the probability that a hand of poker contains all four suits?

We'll use the naïve definition of probability, counting the number of allowed hand divided by the total number of hands:

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We know the denominator is $\binom{52}{5}$. Let's try to figure out the numerator using the the multi-stage experiment formulation.

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In the third stage we choose the $\binom{13}{1} \cdot \binom{13}{1} \cdot \binom{13}{1}$ cards from the other suits.

Putting this together yields:

$$
\begin{aligned}
\mathbb{P}(\text{all four suits}) &= \frac{\binom{4}{1} \cdot \binom{13}{2} \cdot \binom{13}{1}^3}{\binom{52}{5}} \\
&= 0.2637455
\end{aligned}
$$

A fairly high percentage!