1. General advice on homework:

(c) Explain your answers, especially when it's a word problem. It's hard to give partial credit when all I see is a product of numbers and no words of explanation.

(ii) Assertion = Proof. Don't say "it always happens" without a serious explanation.

#2. Here's another way:

\[ \text{For } 0 \leq k \leq 5, \text{ say there are } k \text{ students on the top. The places can be chosen in } \binom{5}{k} \text{ ways.} \]

This leaves 6 - k places from which to choose 5 - k students. This gives \[ \sum_{k=0}^{5} \binom{5}{k} \binom{5-k}{5-k} \] places for students, which can be filled in 5! ways. The prob to go in 7! ways. But...

\[ \frac{6!}{5!5!} \frac{(6-k)!}{(5-k)!} \]

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#4. The temptation to place points at "best possible" is to be avoided. Think about: how can you place 3 points on a circle closest apart from each other as possible?

#6. See comment above.

#5. A common approach was to select cards from the hand.

52 \rightarrow 1st card 3-12 \rightarrow 2nd card

2 \leq \text{difficult, difficult value}

1 \leq \text{difficult, difficult value}

36 \leq \text{any suit, difficult value}

52 \rightarrow 36 \rightarrow 22 \rightarrow 10 \rightarrow 36.

But now, how many different ways does the same hand get picked?

It's not 5! because the last card is always from the same suit as one of the first 4.

E.g. 14 \leftrightarrow 3 \leftrightarrow 4C \leftrightarrow 5D \leftrightarrow 6S. As one example

(3 \leftrightarrow 4C \leftrightarrow 5D \leftrightarrow 6S) 2 \leftrightarrow 4 \leftrightarrow 10 \leftrightarrow 24.

I claim each hand appears 24 times.

So we get 6 \times 25 \times 5 \times 7 = 2^5 \times 6 \times 7!

as before.

Some people noted the symmetry \( \binom{5}{2} \) and missed \( \frac{2}{2} \times \binom{5}{2} \). That's ok too. If it's correct, it's ok too.