

MH 227, Spying a Heart *Proposed by Jeffrey Liebner, Lafayette College, Easton, PA.* Does the glimpse of a heart change the probability that your opponent has two aces?

*Solution by the **Armstrong Problem Solvers**, Armstrong Atlantic State University, Savannah, GA.*

Yes. Without a glimpse, the probability that both cards will be aces is $\binom{4}{2}/\binom{52}{2} = 6/1326 = 1/221$. The number of two-card hands with at least one heart is $\binom{52}{2} - \binom{39}{2} = 1326 - 741 = 585$. Of these 585 hands, only 3 of them have two aces, namely the hands with the ace of hearts and one of the other three aces. Thus, with the glimpse, the probability that both cards are aces is $3/585 = 1/195$. The glimpse increases the probability from $1/221$ to $1/195$.

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