

Mathematics 1550H – Probability I: Introduction to Probability

TRENT UNIVERSITY, Summer 2023 (S62)

Assignment #2

A Hand of Ill-Omen

Due just before midnight on Friday, 30 June.*

Recall that a standard 52-card deck has 4 *suits*, namely \heartsuit , \diamondsuit , \clubsuit , and \spadesuit , each of which has 13 cards of different *kinds* or *ranks*, namely $A, K, Q, J, 10, 9, 8, 7, 6, 5, 4, 3$, and 2 .

One infamous five-card hand is the *Dead Man's Hand*, consisting of $A\clubsuit, A\spadesuit, 8\clubsuit, 8\spadesuit$, and $Q\heartsuit$. According to legend – there seem to be no contemporary accounts that describe the hand – this is the poker hand that James Butler “Wild Bill” Hickok held when he was shot in the back of the head in a saloon in the town of Deadwood in the then Dakota Territory in 1876.

1. If you draw a five-card hand at random and all at once (so order doesn't matter), what is the probability that it will be the Dead Man's Hand? [1]
2. If you draw a five-card hand at random and all at once (so order doesn't matter), what is the probability that it will have no card in common with the Dead Man's Hand? [2]
3. If you draw a five-card hand at random and all at once (so order doesn't matter), what is the probability that it will have exactly one card in common with the Dead Man's Hand? [2]
4. If you draw a five-card hand at random and all at once (so order doesn't matter), what is the probability that it will have at least one card in common with the Dead Man's Hand? [5]

* You should submit your solutions via Blackboard's Assignments module, preferably as a single pdf. If this fails, you may submit your work to the instructor on paper or by email to sbilaniuk@trentu.ca.