

Name: _____

Directions: Show all work. No credit for answers without work.

1. A fair die is rolled 3 times. Let A be the event that the first roll is strictly smaller than the second (so $(4, 5, 1) \in A$ but $(4, 4, 1) \notin A$). Let B be the event that all three rolls are distinct.

(a) [**1 point**] What is the probability space Ω ? What is $|\Omega|$?

(b) [**2 points**] Determine $\Pr(A)$ and $\Pr(B)$.

(c) [**2 points**] Determine $\Pr(A|B)$ and $\Pr(B|A)$.

(d) [**1 point**] Are the events A and B pos. correlated, neg. correlated, or independent?

2. [**2 parts, 2 points each**] Recall that a standard deck of cards has one card for each rank/suit pair, where the ranks are [ace, 2 through 10, jack, queen, king], and the suits are [clubs, hearts, diamonds, spades]. A 5-card poker hand is dealt from a freshly shuffled deck.

(a) What is the probability that hand has no spades?

(b) It is revealed that the hand has all distinct ranks. Now what is the probability that the hand has no spades?