

Homework 9, Morally due Tue Apr 23, 3:30PM  
**THIS HW IS TWO PAGES!!!!!!!!!!!!**

1. (40 points) Throughout this problem Bill has a 2-sided dice with numbers 1,2 and a 3-sided die with numbers 1,2,3.
  - (a) (15 points) Assume both dice are fair. Bill throws both of them. For  $2 \leq i \leq 5$  give the prob that the sum is  $i$ .
  - (b) (20 points) Let  $0 \leq p \leq \frac{1}{2}$ . Assume the 2-sided dice is fair but the 3-sided dice has  
Prob of 1 =  $p$   
Prob of 2 =  $1 - 2p$   
Prob of 3 =  $p$   
Bill throws both of them. For  $2 \leq i \leq 5$  give the prob that the sum is  $i$ .
  - (c) (5 points) Let  $p$  be as in the last part. Is there a value of  $p$  such that all of the sums 2, 3, 4, 5 come up with the same probability.
  - (d) (0 points but thing about it) Can you load two 6-sided dice to get fair sums?

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2. (60 points) On the planet Vorlon they play a game that is similar to what we call Poker but with a different deck of cards.

Every card has a rank from  $\{1, 2, \dots, 7\}$ .

Every card has a suite from  $\{R, B\}$ .

Every player gets 3 cards.

In most of the questions we will ask for the prob of a certain type of hand. Give the answer to 4 places since the last question is to rank them.

- (a) What is prob of a straight that is NOT a flush (e.g.,  $3R, 4R, 5B$ )  
We DO allow wrap-around, so 7-1-2 counts.
- (b) What is prob of a flush that is NOT a straight (e.g.,  $2R, 4R, 9R$ )
- (c) What is prob of a straight flush (e.g.,  $3R, 4R, 6R$ ) We DO allow wrap-around, so 7-1-2 counts.
- (d) What is prob of a pair (e.g.,  $3R, 3B, 7R$ ). Note that a pair cannot be a straight of a flush.
- (e) What is prob of getting NOTHING- a hand that is neither a straight, nor a flush, nor does it contain 2 of a kind. (e.g.,  $3R, 5R, 6B$ )
- (f) Rank the types of hands from most likely to least likely.