

Answer the questions below. You may answer in the space provided. You may use the back or a separate sheet of paper if you need more space. You are to work in groups of no more than four people. Make sure to enter the names of your groupmates below.

Name: _____

Section: _____

Group Members: _____

1. For a certain game, the a player first draws a card from a standard deck and then draws a marble from one of two bags. If the player draws a spade, heart, or club, the player picks a marble from the first bag which has 8 white marbles and 10 red marbles. If the player draws a diamond, the player picks a marble from the second bag which contains 2 white marbles and 1 red marble. We wish to determine the probability that in this game, the player will draw a red marble.
 - (a) (1 point) Into what two events should we partition the sample space in order to use the Law of Total Probability to determine the probability of picking a red marble in this game?

 - (b) (1 point) What are the probabilities of the events listed above?

 - (c) (1 point) Calculate the probability of picking a red marble using the Law of Total Probability.

2. (4 points) From DeMorgan's Law, we know that $(A \cup B)^c = A^c \cap B^c$. Use this to show that if A and B are independent, then A^c and B^c are independent.

3. (2 points) For blood types, the alleles A and B act as dominant genes, the allele O as a recessive gene. If a person has both A and B alleles, that person has type AB blood, if the person has two O alleles, that person has type O blood, and for other cases, the person has the blood type denoted by the dominant gene. Two parents each have both the B and O alleles. What is the probability of their child having each of the three blood types?