

**Homework 2** (*Assume independence and equally likely wherever needed.*)

1. Bob has 2 siblings. He has blood type O, his father has blood type A, and his mother has blood type B. Decide the probability that both siblings are female given the following conditions.
  - (a) At least one sibling is female.
  - (b) At least one sibling has blood type A.
  - (c) At least one sibling is female and at least one sibling has blood type A.
  - (d) At least one sibling is female with blood type A.
  - (e) At least one sibling is female with blood type AB.
2. Consider Monty-Hall game with 100 doors.
  - (a) Suppose Guest chooses Door 1 and Host opens Door 2. Decide the probability that prize car is behind Door 100.
  - (b) Suppose Guest chooses Door 1 and Host opens Door 2 to Door 99. Decide the probability that prize car is behind Door 100.
3. Romeo and Juliet have a date, for which each arrives with a delay between 0 and 1 hour, with all pairs of delays being equally likely. Romeo waits at most 30 minutes and Juliet waits at most 20 minutes.
  - (a) Find the probability that they see each other.
  - (b) Given that, what is the probability that Juliet arrives first?
4. A hand consists of 13 cards dealt from a deck of 52 cards.
  - (a) Find the probability that the hand is void in Hearts.
  - (b) Find the probability that the hand contains no void suits.
5. Find the following probabilities.
  - (a) Draw 4 cards from a deck of cards with at least 1 Spades.
  - (b) Draw 8 cards from a deck of cards with at least 2 Spades.
  - (c) Draw 13 cards from a deck of cards with at least 3 Spades.