

## AP Statistics Chapter 6 Practice FR Test – Probability and Simulation

1. Suppose that for a group of consumers, the proportion that eats pretzels is  $.75$  and the proportion that drinks Coke is  $.65$ . Further suppose that the proportion that eats pretzels *and* drinks Coke is  $.55$ . Define the following events:  $A$  = consumer eats pretzels;  $B$  = consumer drinks Coke.
  - a) Sketch a complete Venn diagram that represents this information.
  - b) What proportion of Coke drinkers also eats pretzels?
  - c) Determine, mathematically, whether these two events are independent.

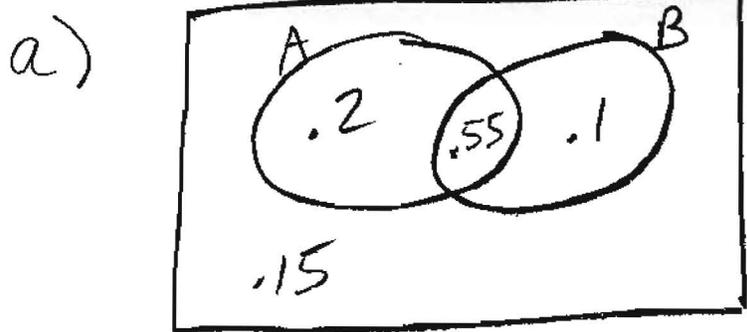
2. A bag contains 5 marbles: 1 red, 2 white and 2 blue. A game will be played in which Player A draws one marble from the bag at random (without replacing it), followed by another random draw of one marble by Player B.

- a) Construct a complete tree diagram of the sample space for this game.

**Use the diagram constructed in part a) to answer the following questions.**

- b) What is the probability that a game will produce two marbles of the same color?
  - c) What is the probability that a game will produce at least one blue marble?
3. Suppose there are 10 multiple choice questions on a quiz. Each question has three choices (a, b, and c) for an answer. Unfortunately, you went to see a movie the night before, and you were unprepared for the quiz. You decide to guess the correct answers by randomly choosing one of the three choices. Describe a simulation to estimate the probability of answering at least 4 of the ten questions correctly
    - a) How will you use random digits to simulate a person guessing correctly?
    - b) Use the random digits table, starting at line **103** to carry out 3 repetitions. That is, simulate taking the quiz 3 times. Keep track of your results
    - c) According to your results, what is the probability that you answer at least 4 of the ten questions correctly?

1.

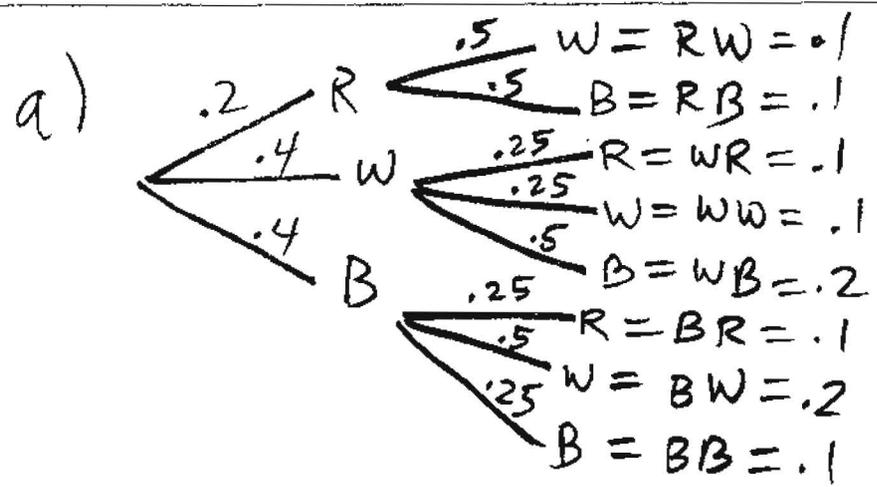


b) 
$$P(A|B) = \frac{P(A \text{ and } B)}{P(B)}$$

$$= \frac{.55}{.65} = \textcircled{.846}$$

c) If independent,  
 then  $P(A \text{ and } B) = P(A)P(B)$   
 $P(A \text{ and } B) = .55$   
 $P(A)P(B) = (.75)(.65)$   
 $= .4875 \neq .55$   
 So, NOT INDEPENDENT

2.

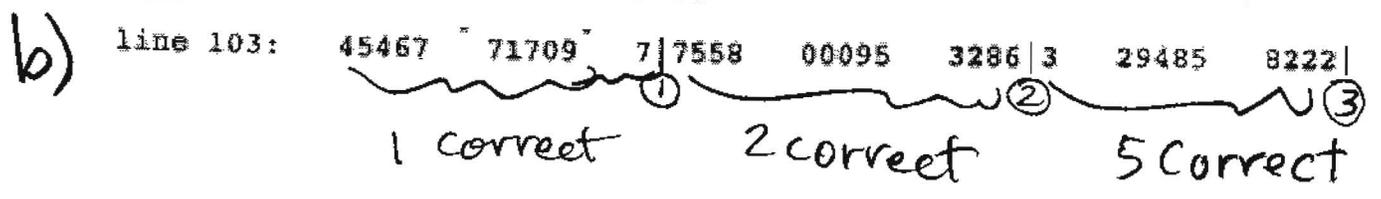


b)  $WW + BB$   
 $= .1 + .1 = \textcircled{.2}$

c)  $.1 + .2 + .1 + .2 + .1$   
 RB WB BR BW BB  
 $= \textcircled{.7}$

3.

a) Let 1-3 = Correct, 4-9 = wrong,  $\emptyset$  = ignore



c) Out of the 3 tests, we got  
 4 or more correct once, so  $\textcircled{\frac{1}{3}}$