Stat 414 Quiz #1

Spring 2016

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Start Time: 10:43 am/(pm) Stop time: _____ am/pm

You must show all of your work in order to receive full and/or partial credit. No work=No Credit. 2 pages, 10 points

1. 7 points A special M&M's chocolate packet is made of only red (R), oragne (O), and yellow (Y) colored chocolates. Each color has same number of chocolates. A person randomly draws a chocolate from the packet **two** times.

   (a) 1 points Identify 9 elements of the sample space.

   {RR, RO, RY, OO, OR, OY, YY, YO, YR}

   (b) 2 points Let A = {no red chocolate}, B = {at least one orange chocolate}, and C = {at most one yellow chocolate}. Find $P(A \cup B)$.

   $A \cup B = \{OO, OY, YY, YO, RO, OR\}$

   $P(A \cup B) = 6/9 = 2/3$

   (c) 2 points Let A, B, C be as in (b). Find $P(A \cap B \cap C)$.

   $A = \{\underline{OO}, \underline{OY}, YY, \underline{YO}\}$

   $B = \{RO, \underline{OO}, OR, \underline{OY}, \underline{YO}\}$

   $C = \{RR, RO, RY, \underline{OO}, OR, \underline{OY}, \underline{YO}, YR\}$

   $A \cap B \cap C = \{OO, OY, YO\}$

   $P(A \cap B \cap C) = 3/9 = 1/3$

   (d) 2 points Represent the event {YY} in terms of A, B, C as in (b) using union, intersection, and complement operations.

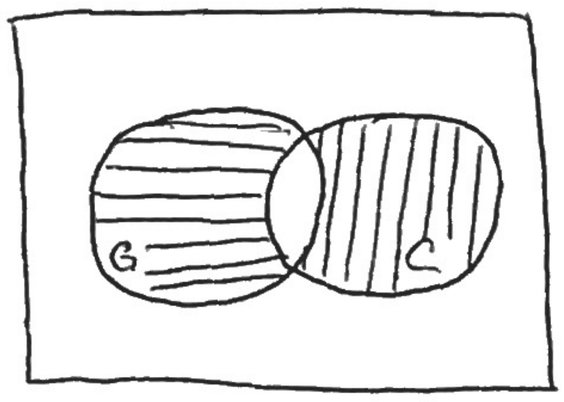
   $C' = \{YY\}$

   $B' \cap A = \{YY\}$

   $(A \cup B \cup C) \cap C'$

   $\emptyset \cup C'$

2. 3 points Of the customers who visit a donut shop, 45% buy glazed donut, 35% buy chocolate donut, and 20% buy both. What is the probability that a randomly selected customer buys only one type of donut?



THE HORIZONTAL LINES REPRESENTS AREA OF ONLY GLAZE.

$$P(G) - P(G \cap C)$$

$$.45 - .20 = .25$$

THE VERTICAL LINES REPRESENTS AREA OF ONLY CHOCOLATE.

$$P(C) - P(G \cap C)$$

$$.35 - .20 = .15$$

THE PROBABILITY OF ONLY GLAZE OR ONLY CHOCOLATE IS THE SUM OF THESE VALUES

$$.25 + .15 = .40$$