COT 3100 Recitation #9: Probability
11/7-10/2016

Warm-Up Problems

1) A class collects $50 to buy flowers for a classmate who is in the hospital. Roses cost $3 each and carnations cost $2 each. No other flowers are to be used. How many differnet bouquets could be purchased for exactly $50?

2) For each positive integer n, the mean of the first n terms of a sequence is n. What is the 2008th term of the sequence?

3) A circle has radius of $\log_{10}(a^2)$ and a circumference of $\log_{10}(b^4)$. What is $\log_a b$?

4) A rectangular floor measures a feet by b feed, where a and b are positive integers with b > a. An artist paints a rectangle on the floor with the sides of the rectangle parallel to the sides of the floor. The unpainted part of the floor forms a border of width 1 foot around the painted rectangle and occupies half the area of the entire floor. How many possibilities are there for the ordered pair (a, b)?

5) Bricklayer Brenda would take 9 hours to build a chimney alone, and bricklayer Brandon would take 10 hours to build it alone. When they work together, they talk a lot, and their combined output decreased by 10 bricks per hour. Working together, they build the chimney in 5 hours. How many bricks are in the chimney?

Probability Problems

6) Disease A occurs in 0.05% of the population. If a person does NOT have the disease and takes a test for the disease, the test correctly indicates that they don't have the disease 97% of the time. If a person has the disease and takes the same test, the test correctly indicates that they do have the disease 99% of the time. Given that you've taken the test and have tested positive for disease A, what is the probability you actually have disease A? Given that you've taken the test and have tested negative for disease A, what is the chance that you have the disease anyway?

7) Anderson gets 75% of the multiple choice questions in COT 3100 he answers. Given a set of 20 questions, what is the chance that he gets at least 18 of them? Write your answer using combinations and then use a calculator to get a decimal approximation for it.

8) If A and B are events and p(A) = 3/7, p(A ∩ B) = 1/5, p(A | B) = 1/2 calculate p(B), p(B|A) and p(B |$\bar{A}$), are A and B independent? Mutually exclusive?

9) A bag of popping corn contains 2/5 white kernels and 3/5 yellow kernels. Only 1/3 of the white kernels will pop, whereas 1/2 of the yellow ones will pop. A kernel is selected at random from the bag, and pops when placed in the popper. What is the probability that the kernel selected was white?

10) Bob has been chosen for a half-time promotion at a local basketball game. He will take as many three point shots as he can in 30 seconds. If he makes at least one of the shots, he wins $1000. After some practice, Bob knows that he'll get off 5 shots in the given time and that he chance of making an single shot is 15%. What is the expected value of Bob's prize for this promotion?

11) Mikey is taking a matching quiz with 4 items on it. Unfortunately, Mikey didn't study and he completely guesses the answers, knowing that each of the four words will match to a different definition of the four given. What is the chance that Mikey gets all four definitions incorrect? What is the chance that he gets precisely 3 of the definitions correct? (We assume he matches each word to a unique definition listed.)