Statistics STA 2215
2nd Test
Spring 2002
Dr. Olsh

SHOW ALL OF YOUR WORK

1. A student is about to take a ten-question, multiple-choice test. Each question has five options, A through E. The student, having no knowledge of the material, fashions a device for answering each question randomly.
    a) This student's graded answer sheet will represent one possibility in a distribution of probabilities. Using the formulas that will work for any probability distribution, find the distribution's **mean** and **standard deviation**.

    b) Using the formulas that work only for the "special" distribution illustrated above, find the **mean** and **standard deviation.**

c) Use the table (at the end of the text) for the "special" distribution above to find the probability of a grade of **at most four correct answers**.

d) Without the use of tables or any formulas unique to the "special" distribution above, what can you say about the probability of the number of correct answers being on the interval from zero to four correct?

2. The probability of event A is 0.3; the probability of event B is 0.4. Events A and B are mutually exclusive.

   Are events A and B **dependent** or **independent**? (Circle the correct one.) Support your choice with appropriate analysis.

3. If a zoologist has four male guinea pigs and eight female guinea pigs and randomly chooses two of them for an experiment, what are the probabilities that
   (a) both will be males;

   (b) both will be females;

   (c) there will be one of each sex? [Hint: recall what must be the sum of the probabilities in a particular probability distribution.]

4. For each of the following cases involving areas under the standard normal curve, decide whether the first area is bigger, the second area is bigger, or the two areas are equal. Draw appropriate pictures in showing all of your analysis.

   (a) the area to the left of $z = 1.5$ or the area to the right of $z = -0.5$;

   (b) the area between $z = -1$ and $z = +1$ or the area between $z = 0$ and $z = +2$.

5. (a) If there are six horses in a race, in how many different ways can they place first, second, and third?

(b) Grouping the 100 U.S. senators in the 104th Congress (1995) by seniority, we have exactly 50 senators with 9 years of less of seniority and exactly 50 with 10 years or more of seniority. Altogether, in how many different ways could 2 senators be selected from each of the two seniority groups to form a four-member special committee?

6. An insurance company agrees to pay the promoter of a drag race $15,000 if the race has to be canceled because of rain. If the company's actuary feels that a fair net premium for this risk is $2,400, what does this tell us about his assessment of the probability that the race will have to be canceled because of rain?

7. The probabilities are, respectively, 0.32, 0.49, and 0.25 that a bird watcher will see a bobolink, a meadowlark or both during a short walk in a certain grassy field. What is the probability that a birdwatcher will see either a bobolink or a meadowlark or both during a short walk in this location?

Please sign the following: I have neither given, nor received unauthorized aid on this piece of work, nor have I knowingly tolerated any violation of the Honor Code.

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