MATH-11XX (DUPRÉ) FALL 2012 TEST 1 ANSWERS

DATE: WEDNESDAY 19 SEPTEMBER 2012

FIRST: PRINT YOUR LAST NAME IN LARGE CAPITAL LETTERS ON THE UPPER RIGHT CORNER OF EACH SHEET TURNED IN.

SECOND: PRINT YOUR FIRST NAME IN CAPITAL LETTERS DIRECTLY UNDERNEATH YOUR LAST NAME ON EACH SHEET TURNED IN.

THIRD: WRITE YOUR MATH COURSE NUMBER AND SECTION NUMBER DIRECTLY UNDERNEATH YOUR FIRST NAME ON EACH SHEET TURNED IN.

FOURTH: THERE ARE TWENTY(?) QUESTIONS AND EACH IS WORTH 5 POINTS. WRITE ALL YOUR ANSWERS NEATLY IN THE SPACE PROVIDED UNDER EACH QUESTION. NEATNESS COUNTS. IF I CANNOT READ IT WITHOUT STRAINING MY EYES YOU GET NO CREDIT.

Suppose that a dice is in a box where you cannot see it and you believe that it sits in the box with one face flat on the bottom of the box and X is the number on the top face. Calculate the numerical values indicated, based on this information and the additional information indicated, for each of the following problems.

1. The expected value of X given that the number on top is 1, 2, or 3.

ANSWER: 2

2. The expected value of X given that the number on top is 4, 5, or 6.

ANSWER: 5

3. The probability that the number on top is 1, 2, or 3.

ANSWER: 1/2=0.5

4. The probability that X is in the set $\{1, 2, 3\}$, given that X is 4 times as likely to be in the set $\{1, 2, 3\}$ as not.

ANSWER: 4/5=0.8

5. The probability that the number on top is 2, given that X is 4 times as likely to be in the set $\{1, 2, 3\}$ as not.

ANSWER: (1/3)(4/5)=4/15=0.267

6. The expected value of X given that the number on top is 4 times as likely to be in the set $\{1, 2, 3\}$ as not.

ANSWER: (2)(4/5)+(5)(1/5)=13/5=2.6

Suppose that a box contains 2 BLUE blocks, 3 RED blocks, and 5 GREEN blocks. Suppose that three blocks are drawn from the box without replacement one after another.

7. What is the probability that the SECOND block drawn is RED?

ANSWER: 3/10=0.3

8. What is the probability that the THIRD block drawn is RED given that the FIRST is GREEN and the SECOND is BLUE?

ANSWER: 3/8=0.375

9. What is the probability that the SECOND block drawn is RED given that the FIRST is BLUE and the THIRD is GREEN?

ANSWER: 3/8=0.375

10. What is the probability that ALL three are GREEN?

ANSWER: (5/10)(4/9)(3/8)=1/12=0.0833

Suppose in addition to the preceding information, that GREEN blocks are worth ONE dollar, that RED blocks are worth TEN dollars and BLUE blocks are worth TWENTY dollars.

11. What is the total worth of the blocks in the box?

ANSWER: (1)(5)+(10)(3)+(20)(2)=75 dollars

12. If X is the WORTH of the FIRST block drawn, then what is $E(X)$?

ANSWER: 75/10=7.50

13. If W is the WORTH of the THIRD block drawn, then what is $E(W)$?

ANSWER: 75/10=7.50

14. If T is the total value of the three blocks drawn, then what is $E(T)$?

ANSWER: (3)(7.50)=22.50