

MATH-1110 (DUPRÉ) FALL 2011 PRACTICE TEST 1

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 SPRING 2011 MATH-1110 SECTION NUMBER DIRECTLY UNDERNEATH YOU 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 K is the statement that the fish in my pond have mean length 7 inches with a standard deviation of 2 inches, and mean weight 3 pounds with a standard deviation of 1 pound. Suppose that a fish (henceforth to be referred to as "the fish") is taken from my pond with length X and weight Y .

1. What is the optimal guess for the length of the fish, that is, what is $E(X|K)$?
2. What is $E(Y|K)$?
3. What is the expected squared error if you guess the LENGTH of the fish to be $E(X|K)$?
4. If you have the information that the fish is actually 11 inches long, would that have any influence on your guess of the weight of the fish? For instance, is

$$E(Y|K \& (X = 9)) < E(Y|K \& (X = 11))?$$

5. What is $E(3X|K)$?
6. What is $E(3X + 2Y|K)$?

Suppose that a box contains 5 RED blocks, 4 BLUE blocks, and 3 GREEN blocks. Suppose that three blocks are drawn from the box without replacement one after another.

7. What is the probability that the first block drawn is red?

8. What is the probability that the second block drawn is red?

9. What is the probability that the third block drawn is red given that the first is red and the second is blue?

10. What is the probability that the first block drawn is red given that the second is blue and the third is red?

11. What is the probability that two of the drawn blocks are red and one is blue?

Suppose in addition to the preceding information, that red blocks are worth ONE dollar, that blue blocks are worth TWO dollars and green blocks are worth THREE dollars.

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

13. If X is the value of the first block drawn, then what is $E(X)$?

14. If Y is the value of the second block drawn, then what is $E(Y)$?

15. If W is the value of the third block drawn, then what is $E(W)$?

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

Suppose that X is an unknown which has the possible values 1,2,3,5,6, and it is three times as likely to be even as odd, but all even numbers are equally likely and all odd numbers are equally likely. That is,

$$P(X = 1) = P(X = 3) = P(X = 5),$$

and

$$P(X = 2) = P(X = 6).$$

17. What is the probability that X is odd?
18. What is the probability that X is even?
19. What is the probability that $X = 5$?
20. What is the expected value of X ?
21. What is the number of permutations of the letters in the word LOCK?
22. What is $P(7, 4)$, the number of ways to arrange 4 things taken from a set of 7 things?
23. What is $C(7, 4)$, the number of ways to choose 4 things from a set of 7 things?
24. If a mailman has 9 letters to put in empty mailboxes A,B,C, in how many ways can he put three letters in each mailbox?
25. If a mail man has 9 letters and empty mailboxes A,B,C, in how many ways can he put 4 letters in A, put 3 letters in B, and 2 letters in C.