MATH-1110 (DUPRÉ) FALL 2010 TEST 1 ANSWERS

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

SECOND: PRINT YOUR FIRST NAME IN CAPITAL LETTERS DIRECTLY UNDERNEATH YOUR LAST NAME.

THIRD: WRITE YOUR FALL 2010 MATH-1110 LAB DAY DIRECTLY UNDERNEATH YOU FIRST NAME.

You find two gold nuggets which your great grandparents left you. You pick up one in each hand and can feel that the nugget in your right hand is heavier than the nugget in your left hand. You guess the nugget in your left hand weighs 5 ounces.

1. Of the numbers below, circle the numbers which are NOT possible for your guess of the weight of the nugget in your right hand, according to our rules for guessing.

0 1 2 3 4 5 6 8

ANSWER: CIRCLE ALL that are **LESS THAN** 5, thus 5 itself should not be circled.

2. In the year 1955 Gold was worth 35 dollars an ounce. According to our rules for guessing, what should you guess was the value of the nugget in your left hand in dollars in the year 1955?

ANSWER: Let X be the weight in ounces of the nugget in your left hand. We have $E(X|K) = 5$. Let Y be the 1955 value in dollars of the nugget. Then $Y = 35X$, so

$$E(Y|K) = E(35X|K) = 35E(X|K) = (35)(5) = 175.$$

That is, you just multiply your guess of 5 for the weight in ounces by the 35 dollars per ounce for the value of gold per ounce.

3. If you guess that the nugget in your right hand weighs 10 ounces, then what should you guess is the total weight in ounces of the two nuggets together?

ANSWER: Let X be the weight of the nugget in your left hand in ounces and let Y be the weight of the nugget in your right hand in ounces. The total weight of both together we can denote by T. Then we have $T = X + Y$, so

$$E(T|K) = E(X|K) + E(Y|K) = 5 + 10 = 15,$$

which is to say, you simply add the two guesses together to get the guess for the total.

4. If you guess there is a 40 percent chance that at todays gold prices the nugget in your left hand is worth over 6 thousand dollars, then what is the percentage chance that it is worth no more than 6 thousand dollars?

ANSWER: Let A be the statement that the nugget in your left hand is worth over 6 thousand dollars. The the statement that it is worth no more than 6 thousand dollars is *not* A. We then have

$$P(\textit{not } A|K) = 1 - P(A|K) = 1 - .4 = .6,$$

so there is a 60 percent chance that the nugget is worth no more than 6 thousand dollars.

5. Imagine a deck of 5 cards where each card has one side which is solid blue and the other side has a whole number less than 6 written on it and no two cards have the same number. You see someone pick the cards up off the table and stack them so all the blue faces are up. The person then shuffles the deck so you cannot tell which card is where in the deck. Next, the person begins turning up the cards one after another taking them from the top of the deck and putting them back on the table. You see the first card turned up has a 2 written on it and you can see the bottom card has 4 written on it. Based on this information, what is the probability that the fourth card turned up will have a 5 on it?

ANSWER: There are only three cards in the deck which you do not know and the 5 could be written on any one of them as far as you know, so the chance that it is actually written on the fourth card from the top is P where

$$P = \frac{1}{3}.$$