MATH-1110 (DUPRÉ) FALL 2010 TEST 3 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.

Suppose that A **and** B **are statements with** $P(A) = .7$ **and** $P(B) = .2$ **Calculate** $P(A \text{ } or \text{ } B)$ **assuming**

1. that $P(A\&B) = .1$.

ANSWER: Use

$$P(A \text{ } or \text{ } B) = P(A) + P(B) - P(A\&B)$$

any time you need to calculate $P(A \text{ } or \text{ } B)$. **Here we have**

$$P(A \text{ } or \text{ } B) = .7 + .2 - .1 = .8.$$

FINAL ANSWER: .8

2. that A **and** B **are mutually exclusive.**

ANSWER: Use

$$P(A \text{ } or \text{ } B) = P(A) + P(B) - P(A\&B)$$

any time you need to calculate $P(A \text{ } or \text{ } B)$. **Since we are told here that** A **and** B **are exclusive we know** $P(A\&B) = 0$, **so now**

$$P(A \text{ } or \text{ } B) = .7 + .2 - 0 = .9.$$

FINAL ANSWER: .9

3. that A **and** B **are mutually independent.**

ANSWER: Use

$$P(A \text{ } or \text{ } B) = P(A) + P(B) - P(A\&B)$$

any time you need to calculate $P(A \text{ } or \text{ } B)$. **Since we are told here that** A **and** B **are independent we know**

$$P(A\&B) = P(A)P(B) = (.7)(.2) = .14,$$

so now

$$P(A \text{ } or \text{ } B) = .7 + .2 - 14 = .9 - .14 = .76.$$

FINAL ANSWER: .76

4. If A and B are statements with $P(A) = .6$ and $P(B) = .8$, then what is the smallest that $P(A\&B)$ can be?

ANSWER: Since no probability can exceed one, and we have here

$$1 \geq P(A \textit{ or } B) = .6 + .8 - P(A\&B) = 1.4 - P(A\&B),$$

it is obvious that we must have

$$P(A\&B) \geq .4$$

to keep $P(A \textit{ or } B)$ from exceeding one.

FINAL ANSWER: .4

5. In Louisiana a private vehicle liscense plate has three letters followed by 3 digits and there are 26 letters possible for each letter position (repeats are allowed) and there are ten possible digits for each digit position (and repeats are allowed in digit positions as well). How many different Louisiana private vehicle liscense plates are possible?

ANSWER: Since the order in which the letters and digits appear is relevant, and as repeats are allowed, each of the first three positions can be filled with any of the 26 letters of the alphabet and any of the ten digits can go in each of the three digit positions, it follows from the MULTIPLICATION PRINCIPLE FOR COUNTING that the number of liscense plates is N where

$$N = 26 \cdot 26 \cdot 26 \cdot 10 \cdot 10 \cdot 10 = 17576000.$$

Notice this is over 17 million possible liscense plates.

FINAL ANSWER: 17576000