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UCLA Department of Statistics

THE EXAM MUST REMAIN STAPLED AT ALL TIMES

UCLA ID: – [redacted] – – – – – – –

LAST NAME (Please, PRINT): – – [redacted] – – – – – – – – – –

FIRST NAME: [redacted] – – –

(a) WRITE AND MARK YOUR NAME AND ID ON THE SCANTRON

(b) WRITE YOUR NAME ON BOTH SIDES OF THE CHEAT SHEET.

(c) DO NOT DETACH ANY PAGES FROM THIS EXAM. EXAM MUST STAY STAPLED DURING THE WHOLE EXAM.

Other important Instructions–Read. Points lost for not following directions.

- SILENCE AT ALL TIMES IN THE EXAM ROOM. Wait until you are out to talk and access your belongings in the backpack.
- Closed books, closed notes.
- Only scientific calculator allowed for computations. NO GRAPHICS CALCULATORS ALLOWED. You may not use your phone or any other electronic device as calculator. Graphics calculators are not allowed. No exceptions. You get 0 points in the exam.
- Phones and other electronic devices must be disconnected before you enter the classroom and not turn on again until you are out of the room. While in the classroom, they must be in your backpack and your backpack on the floor. Phones in pockets will lead to 0 points in the exam. It is not worth the risk.
- Answer for multiple choice questions will be marked in scantron AND the exam. Work will not be read in multiple choice;Failure to mark your name, ID or some answers will result in point deduction from the exam grade.
- Left handed students will sit in a seat for left-handed students. The professor will tell students where to sit. Please, let the professor know that you are left handed ahead of time and she will move you.
- ID must be ready to show BEFORE and at all times during the exam. NO ID, no exam.
- This midterm must show your individual work. Talking to others during the midterm, not adhering to the above, sharing information or breaking any other aspect of the student code of conduct at UCLA will not be tolerated. You can not exchange papers or information. All your things must be on the floor. You may not use the empty seats next to you to put things. Close the tables. Honor code applies.

- Cheat sheet can have only formulas and definitions, no solved problems, no examples of any kind, no proofs, no numerical examples, no intermediate steps and no drawings or graphs of any kind.YOUR NAME MUST BE ON CHEAT SHEET AT ALL TIMES. Be ready to show your cheat sheet when the instructor requests it. The cheat sheet must be written all in English. Cheat sheets that do not comply will result in lower grade in the exam.
- Failure to follow instructions given here will result in loss of points in the exam in a first warning and more severe consequences on a second warning. Honor code applies. Familiarize yourself with student code of conduct by visiting the links provided in the course syllabus.

You may use this page for scratch work

MULTIPLE CHOICE QUESTIONS. ONLY ONE ANSWER IS CORRECT. CHOICE MUST BE MARKED ON THE SCANTRON, AND ALSO HERE ON THE EXAM. ONLY THE SCANTRON WILL BE GRADED. NO MARKS ON SCANTRON OR MORE THAN ONE MARK WILL RESULT IN 0 POINTS FOR THE QUESTION NOT MARKED, EVEN IF IT IS MARKED ON THE EXAM. You may use the space near the question for scratch work, but scratch work will not be read.

Question 1

Not yet answered

Points out of 1.00

What is the probability of the event A="having 1 or less defective components" in a system with 3 components where the probability of a component being defective is 0.2 and the components are independent of each other? (1=defective, 0=non defective)

Select one:

- a. 0.896
- b. 0.028
- c. 0.972
- d. 0.784

Question 2

Not yet answered

Points out of 1.00

A pair of fair dice are thrown. If the two numbers appearing are different, find the probability that the sum is six.

Select one:

- a. 0.8777
- b. 0.90
- c. 0.0396
- d. 0.13334

Question 3

Not yet answered

Points out of 1.00

Suppose that 16% of cars fail pollution tests in California. What is the probability that an entire fleet of 7 cars pass the test?

Select one:

- a. 0.29509
- b. 0.66666
- c. 0.0001
- d. 0.7319

Question 4

Not yet answered

Points out of 1.00

You roll two six sided dice, one red and the other green. Let (a,b) represent the number obtained with the red die (a) and the number obtained with the second die (b). Although the red die is fair, the green one is not. It has been loaded to throw the number 1 all the time. How many outcomes are there in the sample space of this experiment? What is the probability of the event A that the number in the red die is a 5?

Select one:

- a. 6 outcomes in S; P(A)=1/6
- b. 12 outcomes in S; P(A) = 10/36
- c. 6 outcomes in S; P(A) = 6/36
- d. 36 outcomes in S, P(A) =1/36

Question **5**

Not yet answered

Points out of 1.00

There is a 50-50 chance that the queen carries the gene for hemophilia. If she is a carrier, then each prince has a 50-50 chance of having hemophilia. If the queen has had three princes without the disease, what is the probability that the queen is a carrier?

Select one:

- a. 0.25
- b. 0.1111112
- c. 0.7125
- d. 0.0625

$P(H) = 0.5$

$P(P|$

$P(Q) = 0.5$

$P(P|Q) = 0.5$

$P(Q|P^cP^cP^c)$

$= \frac{P(P^cP^cP^c|Q)P(Q)}{P(P^cP^cP^c)}$

$= (0.5)^3(0.5)$

Question **6**

Not yet answered

Points out of 1.00

Suppose that each child born to a couple is equally likely to be a boy or a girl independent of the sex distribution of the other children in the family. For a couple having 5 children, compute the probability that there is at least one girl.

Select one:

- a. 0.5176
- b. 0.03125
- c. 0.3125
- d. 0.96875

$P(P^cP^cP^c|Q)P(Q)$

$+ P(P^cP^cP^c|Q^c)P(Q^c)$

$(0.5)^3(0.5)$

$+ (0.5)^3(0.5)$

$(0.5)(0.5)$

$= 0.25$

0.25

Question **7**

Not yet answered

Points out of 1.00

In the simulation conducted to estimate the probability that 3 people that take the elevator of a 6 floor building get off at different floors,

we used as probability model the roll of a fair die. What did a trial consist of?

Select one:

- a. rolling the die once
- b. rolling the die 10 times
- c. rolling the die 1 million times
- d. rolling the die three times

$P(Q) = 0.5, P(Q^c) = 0.5$

$P(P|Q) = 0.5$

$P(P^c|Q) = 0.5$

$P(Q|P^cP^cP^c) = ?$

$P(P^c|Q^c)$

$= P(Q^c|P^c)P$

$P(Q^c)$

Question **8**

Not yet answered

Points out of 1.00

A coin is weighted so that a head is twice as likely to appear as a tail. The probability of a head is then

Select one:

- a. 2/3
- b. 1/8
- c. 3/4
- d. 1/3

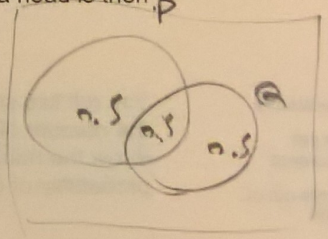
$P(H) = 0.66$

$P(T) = 0.33$

$\frac{2}{3} + \frac{1}{3} = 1$

$2/3$

$P($



Question **9**

Not yet answered

Points out of 1.00

Basketball players who make several baskets in succession are described as having a "hot hand". Fans and players have long believed in the "hot hand" phenomenon, which refutes the assumption that each shot is independent of the next. What other explanation is possible for the hot hand?

Select one:

- a. The axioms of probability.
- b. The product rule
- c. The law of large numbers
- d. The union rule

$\Sigma 1$

$\frac{P(P^cP^cP^c|Q)P(Q)}{P(P^cP^cP^c)}$

$\frac{(0.5)^3(0.5)}{(0.5)^4 + (0.5)}$

$= \frac{P(P^cP^cP^c|Q)P(Q)}{P(P^cP^cP^c|Q)P(Q) + P(P^cP^cP^c|Q^c)P(Q^c)}$

Question **10**

Not yet answered

Points out of 1.00

In October 1994, a flaw was discovered in the Pentium Chip installed in many new personal computers. The chip produced an incorrect result when dividing two numbers. Intel, the manufacturer of the Pentium chip, initially announced that such an error would occur once in 9 billion divides or once in 27,000 years for a typical user; consequently, it did not immediately offer to replace the chip. They soon discovered that it did not take anywhere near 27,000 years for an error to occur. Within weeks of the release, clients were reporting errors in their calculations.

If an error occurs ``once in 9 billion divides'' as Intel maintained, what is the probability that at least one error will occur in two billion divides?

Select one:

- a. 0.3588
- b. 0.19926
- c. 0.42624
- d. 0.0000001

$P(E) = \frac{1}{9 \times 10^9}$

$1 - \left(1 - \frac{1}{9 \times 10^9}\right)^{2 \times 10^9}$

Question **11**

Not yet answered

Points out of 1.00

An insurance company examines its pool of auto insurance customers and gathers the following information:

(i) all customers insure at least one car

(ii) 64% of the customers insure more than one car

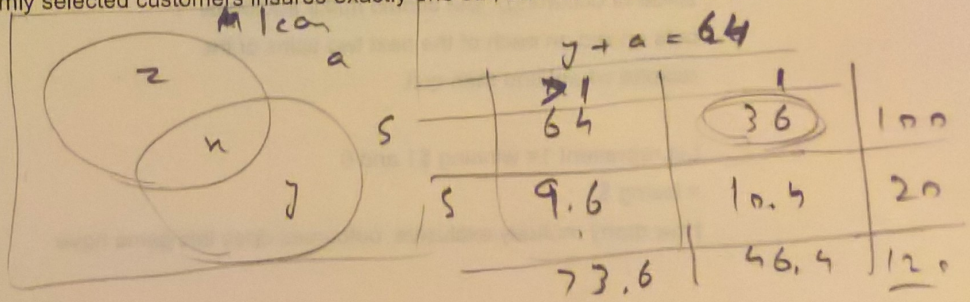
(iii) 20% of the customers insure a sports car

(iv) Of those customers who insure more than one car, 15% insure a sports car

What is the probability that a randomly selected customers insures exactly one car, and that car is not a sports car?

Select one:

- a. 0.256
- b. 0.104
- c. 0.36
- d. 0.096



Question **12**

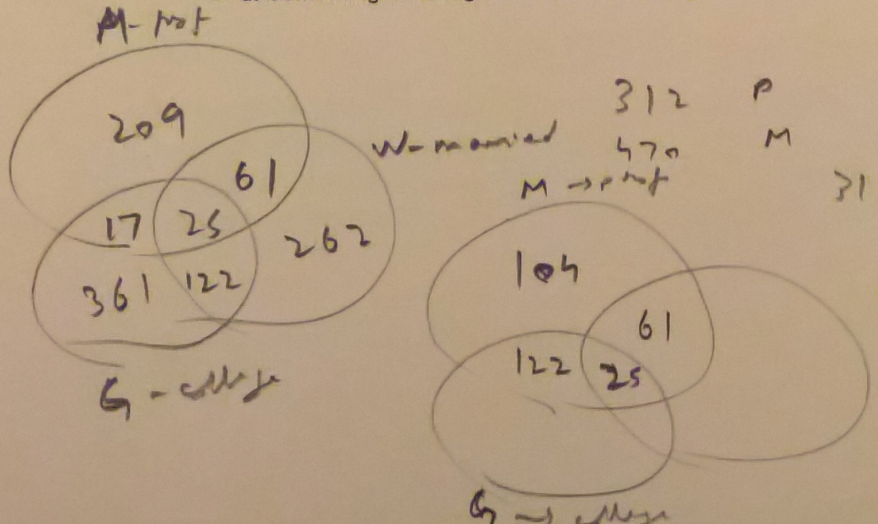
Not yet answered

Points out of 1.00

The following data were given in a study of a group of 1000 subscribers to a certain magazine. In reference to job, marital status , and education, there were 312 professionals (M), 470 married persons (W) and, 525 college graduates (G), 42 profesional college graduates, 147 married colege graduate, 86 married professionals, and 25 married profesional college graduates. Which of the following is correct?

Select one:

- a. The probability of the union of M, G, W is larger than one after we account for the intersecting events
- b. The events M,G, W are mutually exclusive
- c. The probability of the intersection of these events is larger than 1.
- d. Something is wrong about the numbers given because the Probability of the union of M,G, W is less than 1.



Question **13**

Not yet answered

Points out of 1.00

A tray containing 20 bags of recently produced potato chips is going to be inspected for defectives.
A defective potato chip bag would be one leaking oil, broken or showing some imperfections.
The tray contains 4 defective bags and 16 nondefective bags.
A random sample of 3 bags is chosen at random. What is the probability that the random sample contains 2 defective bags?
Recall that "at random" means without replacement.

4 D 16 N

2 defective

DDN
NDD
DND

$\left(\frac{4}{20}\right)\left(\frac{3}{19}\right)\left(\frac{16}{18}\right) + \left(\frac{16}{20}\right)\left(\frac{4}{19}\right)\left(\frac{3}{18}\right) + \left(\frac{4}{20}\right)\left(\frac{16}{19}\right)\left(\frac{3}{18}\right)$

Select one:

- a. 0.991
- b. 0.201
- c. 0.5052632
- ✓ d. 0.08421053

Question **14**

Not yet answered

Points out of 1.00

A gambling book recommends the following "winning strategy" for the game of roulette. It recommends that a gambler bet 1 on red.
If red appears (which has probability 18/38), then the gambler should take her 1 profit and quit.
If the gambler loses this bet (which has probability 20/38 of occurring), she should make additional 1 bets on red on each of the next two spins of the roulette wheel and then quit.

Let represent 1= winning $1 and 0
= losing $1.
How many mutualy exclusive outcomes does this game have

Select one:

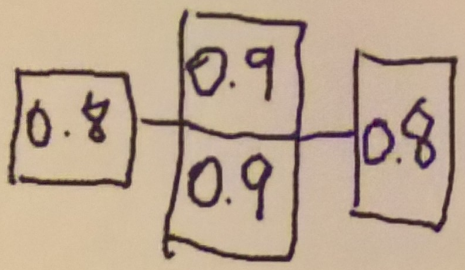
- ✓ a. 5
- b. 1
- c. 8
- d. 4

1
00
01
10
11

Question 15

Not yet answered

Points out of 1.00



What is the reliability of the system in the picture?

Assume all components are independent.

Select one:

- a. 0.0396
- b. 0.1216
- c. 0.90
- d. 0.6336

~~(0.8) 4~~

$$(0.8)\left(0.9+0.9-(0.9)^2\right)(0.8)$$