

Practice First Exam for IENG 213

You may use the "cheat sheets" I created and you may use one set of statistical tables (if needed). You may have notes on the printed sides, only. You may not use your textbook, HW papers or any other materials other than the cheat sheets, and none such can be in sight or within your reach unless in a closed backpack or other bag. Violation will be considered cheating.

Turn off your cell phone and all other electronic devices. No electronic device can be on your desk or in your hand with the exception that you may turn off your phone if it rings -- without answering it.

You may not provide or receive pencils, pens, paper, cheat sheets, or calculators once the test has begun.

If you believe information is missing or ambiguous, raise your hand and I will come to you.

Show your work, especially equations. Except for questions whose answer is a specific fact (not an opinion or interpretation), an unsupported answer is not enough. A "yes" or "no" answer when a conclusion is required will receive a zero unless backed up with statistical or logical proof.

Pts No. Problem statement

- 1 Given that $P(A) = 0.6$ and $P(B) = 0.8$ and that A and B are independent.
- 3 (a) $P(A \cap B) =$ _____
- 3 (b) $P(A \cup B) =$ _____
- 3 2 Three computer brands are each sold with 5 different RAM configurations and 2 different hard disk sizes. How many choices do I have?
- 3 3 Find the number of ways 5 men can be assigned to drive 4 very different cars if no driver can drive more than one car and if it matters which driver is in which car.
- 4 You are choosing snacks for your party. Your choices include:
Chips: 4 out of 5 bags by different brands
Drinks: 3 out of 6 different types of drinks
- 4 (a) How many combinations of chips can you choose?
- 4 (b) How many combinations of drinks can you choose?
- 4 (c) How many combinations of chips and drinks can you choose?

5 From the information given below:

$$P(A) = 0.10$$

$$P(B|A) = 0.80$$

$$P(B) = 0.20$$

$$P(B|A') = 0.06$$

- 4 (a) What is the probability that A and B occur at the same time?
- 4 (b) What is the probability that A' and B occur at the same time?
- 4 (c) Find $P(A|B)$:

6 For the following continuous frequency distribution:

$$f(x) = \begin{cases} 3x^2 & 0 < x < 1 \\ 0 & \textit{elsewhere} \end{cases}$$

- 4 (a) Find: $P(0 < x < 0.4)$
- 4 (b) Find Mean of x:
- 4 (c) Find Variance of x:

7 For the function to the right: $f(x, y) = 4xy$, $0 \leq x \leq 1$, $0 \leq y \leq 1$
 $= 0$, *otherwise*

4 (a) Determine whether $f(x,y)$ is a possible distribution

4 (b) Find the marginal distribution of x

4 (c) Find the marginal distribution y

4 (d) Find the mean of x :

4 (d) Find the conditional probability distribution of x given y :

4 (e) Find the probability X is between 0 and 0.1 given $y=0.5$

2 (f) Find the probabilities by inspection:

$$P(X < 1) =$$

$$P(y > 2) =$$

4 (g) Are X and Y independent?

8 Given the joint probability distribution below:

f(x,y)		x		
		1	2	3
y	1	0.10	0.05	0.05
	2	0.05	0.10	0.35
	3	0.00	0.20	0.10

4 (a) List the marginal distribution of X

4 (b) List the marginal distribution of Y (see above)

4 (c) Find $P(Y=2 | X=3)$

4 (d) Are X and Y independent ?

- 1 9 Is there anything that appears wrong about the following distribution?

x	0	1	2	3	4
f(x)	0.28	0.22	0.33	0.17	0.1

- 4 10 Given the following, find the mean of Z and the variance of Z

$$z = 2x - y + 4$$

$$\mu_x = 1 \quad \sigma_x^2 = 1$$

$$\mu_y = 2 \quad \sigma_y^2 = 2$$

$$\sigma_{xy} = -3$$

- 4 11 It is critical that at least one of 3 copies of a signed document reach federal court in 2 hours. You send the 3 copies, each by a different method. Given the data below, what is the probability that at least one will reach the courthouse in time? [Probabilities are independent] Hint: similar to 'electrical circuit' problems.

<u>Method</u>	<u>P(OnTime)</u>
Taxi delivery	65%
Bicycle courier delivery	80%
You drive it and hand-deliver	50%