

**CE 311S: Exam 1**  
Tuesday, March 3  
8:00 – 9:15 AM

Name \_\_\_\_\_

**Instructions:**

- **SHOW ALL WORK** unless instructed otherwise. No shown work means no partial credit!
- If you require additional space, you may use the back of each sheet and/or staple additional pages to the end of the exam.
- If you need to make any additional assumptions, state them clearly.
- You may use a calculator and one regular-sized sheet of notes. No additional resources are permitted.
- The number of points associated with each part of each problem is indicated.

Problem	Points	Possible
1		25
2		20
3		30
4		25
<b>TOTAL</b>		100

**Problem 1.** (25 points). You decide to run for UT student government as a way of procrastinating on your CE 311S homework. After much thought and discussion with roommates, you identify the following platform to run on: (1) the canoe statue should be painted burnt orange; (2) a nuclear reactor should be built in the basement of the EERC; and (3) the cost of an official UT transcript should be reduced.

While the first two planks in your platform fail to get much traction, the third gains a considerable amount of support. Indeed, you conduct a survey of 12 students who reveal the total amount they have spent on transcript-related fees:

48 78 84 72 44 94

- (a) (5) What is the mean amount from the sample?
- (b) (5) What is the median?
- (c) (10) What is the variance?
- (d) (5) What is the standard deviation?

**Problem 2.** (20 points). The *Daily Texan* reaches out to your campaign to request an interview. Since you were just planning to run as a distraction from class and never really wanted to win, you usually don't have good answers to their questions. In fact, 40% of the time you are asked a question, you just mumble incoherently in response.

- (a) (5) If you are asked 10 questions, what is the probability that you mumble fewer than 4 of your answers?
- (b) (5) Instead of being asked a fixed set of questions, now imagine that the poor student interviewer has to get 10 non-mumbled answers to questions before they can submit their article for an assignment. What are the mean and variance of the number of questions they have to ask before they can complete their assignment?
- (c) (5) Additional interview requests come, at an average of 2 every week. What is the probability that you receive exactly 4 additional interview requests in the next 2 weeks?
- (d) (5) For the previous question, what are the mean and standard deviation of the number of additional interview requests in the next 2 weeks?

**Problem 3.** (30 points). Your campaign unintentionally goes viral, becoming wildly popular. The slogan “No more tuition without free transcription” begins to appear scrawled on bathroom walls throughout campus. Your friends convince you to hold a rally at Zilker Park. Holding a rally there requires a non-refundable \$10 deposit, plus a \$100 event fee. You have already paid the deposit, but then get cold feet<sup>1</sup> and consider cancelling the rally so you don’t have to pay the event fee. You consult the weather forecast, hoping this will give you a good reason. You see that there is a 40% chance of rain, a 20% chance of cloudy weather, and 40% chance of sunny weather. If it ends up raining, you will cancel the rally. If it is sunny, you will hold the rally. If it is cloudy, there is a 60% chance you will cancel the rally anyway “as a precaution.”

- (a) (5) What is the probability that you end up holding your rally in cloudy weather?
- (b) (5) What is the probability you will hold your rally at all?
- (c) (10) If you hold your rally, what is the probability that the weather was cloudy?
- (d) (10) What is the mean and standard deviation of the total amount of money you will end up paying to the city — both deposit and event fee, if any?

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<sup>1</sup>Or maybe you just want some money back, so you can pay a transcript fee to apply for an internship.

**Problem 4.** (25 points). Finally, you recruit 4 of your friends to place fliers in the engineering buildings. Each friend chooses one of the six engineering buildings (ASE, BME, CPE, ETC, ECJ, EER) at random, and places fliers there. They choose their buildings without any communication or coordination among them, so it is possible that a building can be chosen multiple times or not at all.

- (a) (5) What is the probability that all of the fliers end up in ECJ?
- (b) (5) What is the probability that at least one of your friends chooses ECJ?
- (c) (5) What is the probability that two of your friends choose ECJ, and two of them choose CPE?
- (d) (5) What is the probability that all of your friends choose the same building?
- (e) (5) What is the probability that all of your friends choose different buildings?