

CSE 312 : Quiz 3 Practice 2

Name:

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Instructions

- You have twenty minutes to complete this exam.
- You are permitted one piece of 8.5x11 inch paper with handwritten notes (notes are allowed on both sides of the paper). You should also get a provided formula sheet (in section it'll be on different colored paper separate from the exam; if you take the exam with DRS it will be the last page of your exam).
- You may not use a calculator or any other electronic devices during the exam.
- We will be scanning your exams before grading them. Please write legibly, and avoid writing up to the edge of the paper.
- If you run out of room, you may also use the last page for extra space, but tell us where to find your answer if it's not right below the problem.
- Since you don't have a calculator, you are generally free to **not** simplify expressions (though you may if you think it will be helpful).
- In general, you should show us the work you used to get to an answer, and explanations will help us reward partial credit, but we do **not** expect explanations at the level we usually require on homeworks.

Advice

- Writing a few words about where an expression came from is often very helpful for awarding partial credit.
- Remember to take deep breaths.

Question	Max points
PDF/CDF	20
CLT	14
Grading Morale	1
Total	35

1. PDFs and CDFs

- (a) Let $f_X(x) = \begin{cases} \frac{1}{4}(x+1) & \text{for } 0 \leq x \leq 2 \\ 0 & \text{otherwise} \end{cases}$
Compute $\mathbb{P}(1 < X < 2)$.

- (b) Let $F_X(x)$ be the CDF of a continuous random variable X . Suppose $a < b < c < d$. Express

$$\mathbb{P}(X < a \cup b < X < c \cup X > d)$$

in terms of $F_X(x)$.

- (c) Determine the constant c that makes the following function a valid PDF:

$$f_X(x) = \begin{cases} ce^{-3x} & x \geq 0 \\ 0 & \text{otherwise} \end{cases}$$

Note: Recall that $\lim_{x \rightarrow \infty} e^{-x} = 0$.

(d) Find the PDF for the following CDF. Be sure to include all cases.

$$F_X(x) = \begin{cases} 0 & \text{for } x < 0 \\ \frac{x^3}{18} & \text{for } 0 \leq x < 2 \\ 7 + \frac{5(x-2)^2}{9} & \text{for } 2 \leq x < 3 \\ 1 & \text{for } x \geq 3 \end{cases}$$



(e) Find the expectation of a random variable Y given by the PDF $f_Y(y) = \begin{cases} \frac{3}{8}y^2 & \text{for } 0 \leq y \leq 2 \\ 0 & \text{otherwise} \end{cases}$

