Show all work. A correct answer with no solution will give only a partial credit.
Write each problem on a separate page. Each answer should be clearly written in the end of the page.
Preferably, make a single pdf file and submit in HuskyCT.

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Let $X_1, X_2, X_3, \ldots$ be independent Poisson random variables with parameter $\lambda = 2$.
Let $S_n = X_1 + X_2 + \ldots + X_n$

(1a) Write a formula for the probability $\mathbb{P}(S_{50} = 101)$.
(1b) Then use a calculator to compute this probability with accuracy up to five decimal places.

(2a) Write a formula for the normal approximation to $\mathbb{P}(S_{50} = 101)$ using the continuity correction.
(2b) Compute compute this approximation using the normal table, with accuracy up to five decimal places.
Hint: your answer in (2b) should be close to, but not exactly the same, as the answer in (1b).

Extra credit question: Prove that *if* X_n *are Geometric* $Geom(p_n = \frac{1}{n})$ *then*

$$\frac{1}{n\lambda} X_n \to Exp(\lambda) \text{ as } n \to \infty \text{ in (probability) distribtion.}$$

Use geometric series to show $\mathbb{P}(\frac{1}{n\lambda} X_n > x) \to e^{-\lambda x} = P(X > x)$ if $X = Exp(\lambda)$, and also show that the moment generating functions converge.

End of the quiz