

Stat 134: Section 14

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Conceptual Review

Please discuss these short questions with those around you in section. These problems are intended to highlight concepts from lecture that will be relevant for today's problems.

- a. What is the moment generating function of a random variable X ?
- b. How do we get the k_{th} moment of X from MGF of X ?
- c. Does MGF uniquely define a distribution? Does MGF always exist?

Problem 1

Suppose U has uniform $(0, 1)$ distribution. Let $W = -\log U$. Find the density of W .

Do you recognize the distribution of W ?

Problem 2

Let $X \sim \text{Binom}(n, p)$

1. Find the moment generating function of X , $M_X(t)$.
2. Use (a) to find $\mathbb{E}(X)$.

Hint: use the binomial theorem, which states that for any a, b , $(a + b)^n = \sum_{k=0}^n \binom{n}{k} a^k b^{n-k}$