Formulas

- $P(E) = \dfrac{\text{Number of outcomes in } E}{\text{Total number of outcomes}}$ if outcomes in the sample space are equally likely.
- $P(E) + P(E') = 1$
- $P(A \text{ and } B) = P(A) \cdot P(B \mid A)$
- $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$
- ${}_nP_r = \dfrac{n!}{(n-r)!}$
- Ways to order n objects with n_1 alike, n_2 alike, $\ldots$, and n_k alike $= \dfrac{n!}{n_1!\, n_2! \cdots n_k!}$ (Given)
- ${}_nC_r = \dfrac{n!}{(n-r)!\, r!}$
- $\mu = E(x) = \sum xP(x)$
- $\sigma^2 = \sum (x-\mu)^2 P(x)$ (Given)
- Binomial:
  - $P(x) = \dfrac{n!}{(n-x)!\, x!}\, p^x \cdot q^{n-x}$ (Given)
  - $\mu = np$
  - $\sigma^2 = npq$
- Geometric:
  - $P(x) = p \cdot q^{x-1}$ (Given)
  - $\mu = \dfrac{1}{p}$
  - $\sigma^2 = \dfrac{1-p}{p^2}$ (Not needed)
- Poisson:
  - $P(x) = \dfrac{\mu^x\, e^{-\mu}}{x!}$ (Given)
  - $\mu = \mu$
  - $\sigma^2 = \mu$ (Not needed)