Topics for Exam 3

1. **Special Distributions**

   1.1 Discrete distributions: Bernoulli, Binomial, Geometric, Hypergeometric, (Discrete) Uniform and Poisson.

   1.2 Continuous distributions: Uniform, Exponential, Normal, and Chi–Square.

2. **Limiting Distributions**

   2.1 The Poisson distribution as a limit of binomial distributions.

   2.2 Convergence in distribution

   2.3 mgf Convergence Theorem

3. **Limit Theorems**

   3.1 Chebyshev Inequality

   3.2 Convergence in probability

   3.3 The Law of Large Numbers

   3.4 Random samples: Sample Mean and Sample Variance

   3.5 The Central Limit Theorem

   3.6 Application of the Central Limit Theorem: Estimating Proportions (Point Estimate and Confidence Interval Estimate).

Relevant sections in the text: 5.4, 5.6, 6.2 and 6.3

Relevant assignments: 17, 18, 19, 20, 21, 22 and 23.

Relevant chapters in the lecture notes: Chapters 6, 7 and 8.

Important Concepts

Independent, identically distributed (iid) random varaibles; convergence in distribution; convergence in probability; limiting distribution; the Central Limit Theorem; the weak Law of Large Numbers; random samples; point estimate; interval estimate; unbiased estimator; consistent estimator.

Important Skills

Know how to use independence; know how to apply the mgf convergence theorem to compute limiting distributions; know how to apply the Central Limit Theorem; know how to apply the Chebyshev's inequality and the weak Law of Large Numbers; know how to obtain point and interval estimates for proportions.