

MATH 205: Statistical methods

December 6th, 2021

Review

Announcements

- Final exam: next Monday (12/13) at 3:30pm.
- Closed-book. You are allowed to bring a one-sided hand-written A4-sized note to the exam.
- You can use calculators (and you should have one).

Chapter 1& 2: Describing datasets

- Summarizing univariate data
 - mean
 - median
 - standard deviation and variance
 - interquartile range
- Correlation
 - Standard coordinates
 - Using correlation to predict

Chapter 3: Basic ideas in probability

3.1 Sample space, events

3.2 Probability

3.3 Independence

3.4 Conditional probability

Chapter 4: Random variables and expectations

4.1 Random variables and probability distribution

- Discrete
- Continuous
- Joint and marginal distributions
- Independent variables

4.2 Expectations

- Mean
- Variance
- Covariance

Chapter 5 & 6: Useful distributions and the sample mean

- Working with normal random variables
- Linear combinations of random variables
- Distribution of the sample mean
 - law of large numbers
 - central limit theorem

Confidence intervals

- Construct confidence intervals for
 - the population mean
 - the difference between two population means
- Confidence intervals and confidence bounds

Hypothesis testings

- Hypothesis testings for
 - the population mean
 - the difference between two population means
- What you need to be able to do
 - Write down a complete testing procedure
 - Compute p -value
- Common mistakes
 - Forget to state (or intentionally avoid stating) the null and the alternative hypothesis: no partial credit if your solution contains mistake
 - Pick the wrong alternative hypothesis: lose some significant point, but the rest of the partial credits are given
 - Wrong p -value
 - Wrong/missing conclusion