

Suggested readings and practice problems from [OpenIntro Statistics, 3rd edition](#) (a free online introductory statistics textbook co-authored by Dr. Cetinkaya-Rundel) for this week:

**Suggested reading:** Chapter 4, Section 4.3, 4.4, 4.5, 4.6 (excluding Section 4.6.2)

**Suggested exercises:** (End of chapter exercises from OpenIntro Statistics)

- Hypothesis tests: 4.17, 4.19, 4.23, 4.25, 4.27
- Inference for other estimators: 4.43, 4.45
- Decision errors, significance, and confidence: 4.29, 4.31, 4.47

(Reminder: the solutions to the end of chapter exercises are at the end of the *OpenIntro Statistics* book)

**Test yourself:**

1. List errors in the following hypotheses:  $H_0 : \bar{x} > 20$  and  $H_A : \bar{x} \geq 25$
2. What is wrong with the following statement? "If p-value is large we accept the null hypothesis since a large p-value implies that the observed difference between the null value and the sample statistic is quite likely to happen just by chance."
3. Suppose a researcher is interested in evaluating the following claim "The average height of adult males in the US is 69.1 inches", and that she believes this is an underestimate.
  - a. How should she set up her hypotheses?
  - b. Explain to her, in plain language, how she should collect data and carry out a hypothesis test.
  - c. Suppose she collects a sample of 40 adult males, and finds a sample average of 70.2 inches, and a p-value of 0.0082. What should she conclude?
  - d. Interpret this p-value (as a conditional probability) in context of the question.
  - e. Suppose that the true average is in fact 69.1 inches, what type of an error has this researcher made? In order to avoid making such an error should she have used a smaller or a large significance level?
4. Describe the differences and similarities between the hypothesis testing procedure using simulation and using theory. Especially discuss how the calculation of the p-value changes while the definition stays the same.
5. Explain what is going on in Figure 4.20 of the book (page 186).
6. In a random sample of 1,017 Americans, 60% said they do not trust the mass media when it comes to reporting the news fully, accurately, and fairly. The standard error associated with this estimate is 0.015 (1.5%). What is the margin of error at 95% confidence level? Calculate a 95% confidence interval and interpret it in context. You may assume that the point estimate is normally distributed (we'll learn how to check this later).

*7. If we want to decrease the margin of error, and hence have a more precise confidence interval, should we increase or decrease the sample size?*