Chapter 11: Testing a Claim

Key Vocabulary:

- Null Hypothesis
- Alternative Hypotheses
- Inference Toolbox
- test statistic
- p-value

- α level
- one-sample z statistic
- statistically significant
- Type I Error
- Type II Error

- power

Calculator Skills:

- normalcdf (X)
- tcdf (X)
- ShadeNorm (leftendpoint, rightendpoint)
- Shade_t (leftendpoint, rightendpoint, df)
- T-Test
- Z-Test
- Draw

11.1 Significance Tests: The Basics (pp.688-703)

1. What is a *null hypothesis*?

2. What is an *alternative hypothesis*?

3. What conditions must be verified before performing a significance test about a population mean or proportion?

1.

2.

3.

4. State the general form of the "*test statistic*".

5. What does the *test statistic* measure?

6. In statistics, what is meant by the *P-value*?

7. If a *P-value* is small, what do we conclude about the *null hypothesis*?

8. If a *P-value* is large, what do we conclude about the *null hypothesis*?

9. Explain the difference between a *one-sided alternative hypothesis* and a *two-sided alternative hypothesis*.

10. What is meant by a *significance level*?

11. How small should the *P-value* be in order to claim that a result is *statistically significant*?

12. When forming a conclusion to a significance test, what are the "three C's" to remember?
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13. On what evidence would we reject the null hypothesis?

14. On what evidence would we accept the null hypothesis (ie. fail to reject the null hypothesis)?

11.2 Carrying Out Significance Tests (pp.704-716)

1. Summarize the "**Inference Toolbox**" used for carrying out significance tests:
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2. For a **one-sample** significance test for a **population mean**, state:
    * H_0
    *   the three possible H_a's (with small sketches to illustrate)

    *   the z test statistic?

3. In terms of rejecting the hypothesis H_0, how is a significance test related to a confidence interval on the same population?

11.3 Use and Abuse ofTests (pp.716-721)

1. What two circumstances guide in choosing a level of significance?
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2. Significance tests are not always valid. What are some factors that can invalidate a test?

3. Why is it important to always plot your data?

11.4 Using Inference to Make Decisions (pp. 722-739)

1. What is a *Type I Error*?

	Truth about the population	
	H_0 true	H_a true
Reject H_0	Type I error	Correct decision
Fail to reject H_0	Correct decision	Type II error

Decision based on sample

2. What is a *Type II Error* ?

3. What is the relationship between the *significance level* α and the probability of *Type I Error*?

4. What is meant by the power of a significance test?

5. Describe how to calculate the power of a significance test

6. State four ways to increase the power of a significance test:

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