

MAT 212 LEARNING OBJECTIVES
TO ACCOMPANY *Statistics for Management and Economics, 6th ed.*

Sections 1.1-1.2

- Be able to identify examples of **descriptive statistics** and **inferential statistics**.
- In the terms of any example be able to identify the **population, sample, parameter, statistic, and statistical inference**.

Section 2.2

- Be able to identify sets of data as either **quantitative** or **qualitative**.

Section 2.3

- Be able to use Minitab to construct a **histogram**.
- Be able to fully interpret the information provided by a histogram:
Describe the **shape: symmetric, positively skewed, or negatively skewed**.
Where are the **typical (central) values**?
What are the **smallest and largest values**?
What values are **atypical or unusual**?

Section 4.2

- Be able to calculate the **mean** and **median** of a sample (using Minitab for large sets of data).
- Know what the symbols \bar{x} and μ represent.
- Know how the mean and median are related for symmetric and skewed distributions of data.

Section 4.3

- Be able to calculate the **standard deviation** using Minitab for any set of data.
- Know what the symbols s^2 , s , σ^2 and σ represent.
- Understand the properties of the standard deviation that are given in class.
- Be able to use the **Empirical Rule** to describe sets of data.

Section 8.3

- Be able to find the **proportion of measurements** that fall under **any part of a normal distribution**. **NOTE:** This is the same as the **probability** of this occurring.
- Be able to find the **value of a normally distributed variable** corresponding to any **given proportion (or probability)**.

Section 9.2

- Know what the symbols $\mu_{\bar{x}}$ and $\sigma_{\bar{x}}$ represent.
- Be able to find the **mean** and **standard deviation (standard error)** of the sample mean, \bar{x} . (Box on page 275.)
- Know when the **sampling distribution of \bar{x} is approximately normal**. (Boxes on pages 274 and 275.)
- Be able to find **probabilities** using the **normal sampling distribution of \bar{x}** .

Section 9.3

- Know what the symbols $\mu_{\hat{p}}$ and $\sigma_{\hat{p}}$ represent.
- Be able to find the **mean** and **standard deviation (standard error)** of the sample proportion, \hat{p} .
- Know when the **sampling distribution of \hat{p}** is approximately normal.
- Be able to find **probabilities** using the **normal sampling distribution of \hat{p}** .

Section 10.3

- Be able to form a **confidence interval for μ** using the following format:

Give the formula to be used to calculate the interval.

Calculate the interval.

Interpret the interval in terms of the problem. This will include the variable, units, etc. of the problem; what is estimated to be in the interval; and the amount of confidence.

- Be able to state when it is valid to use this procedure.
- Be able to explain what “confidence” means.

NOTE: THE FORMAT GIVEN ABOVE, AND THE LAST TWO OBJECTIVES APPLY TO ALL CONFIDENCE INTERVAL PROBLEMS.

Section 10.4

- Be able to find the **sample size** appropriate to estimate μ to within a specified bound for a desired degree of confidence.

Sections 11.2-11.3

- Be able to conduct a **test of hypothesis about μ** using the following format:
 - Give the null hypothesis, H_0 .
 - Give the alternative hypothesis, H_1 .
 - Give the decision rule.
 - Give the test statistic, and calculate the p-value.
 - Interpret the results of your calculations in terms of the problem. This will include the variable, units, etc. of the problem.
- Be able to state when it is valid to use this procedure.
- Be able to define **Type I** and **Type II errors** in terms of the problem.
- Be able to discuss the consequences of these errors.
- Be able to discuss the relative values of α and β as related to the consequences.

NOTE: THE FORMAT GIVEN ABOVE, AND THE LAST FOUR OBJECTIVES APPLY TO ALL TEST OF HYPOTHESES PROBLEMS.

Section 12.2

- Be able to form **confidence intervals** for, and **test hypotheses about, μ** using the **t-distribution**.

- NOTES:**
1. Refer to the objectives in Sections 10.3 and 11.3.
 2. Calculations will be performed with and without the help of Minitab.

Section 12.4

- Be able to form **confidence intervals** for, and **test hypotheses about, p**.
- Be able to find the **sample size** appropriate to estimate p to within a specified bound for a desired degree of confidence.

NOTE: Refer to the objectives in Sections 10.3 and 11.3

Section 13.2

- Be able to form **confidence intervals** for, and **test hypotheses about, $\mu_1 - \mu_2$** .

NOTES: 1. Refer to the objectives in Sections 10.3 and 11.3.
2. Calculations will be performed with the help of Minitab.

Section 13.4

- Be able to form **confidence intervals** for, and **test hypotheses about, μ_D** .

NOTES: 1. Refer to the objectives for Sections 10.3 and 11.3.
2. Calculations will be performed with the help of Minitab.

Section 13.6

- Be able to form **confidence intervals for, and test hypotheses about $p_1 - p_2$** .

NOTE: Refer to the objectives for Sections 10.3 and 11.3

Chapter 18

For each problem relating a **dependent (response) variable, Y**, to an **independent (predictor) variable, X**, be able to do the following: (All analyses will be done on Minitab.)

- Obtain a **scatterplot** of Y vs. X, and fully interpret this plot.
- Obtain the **regression equation**, and interpret the coefficients in terms of the problem.
- Test to see if Y is related to X in a straight-line manner.
- Fully interpret the strength of the straight-line relationship using r^2 .
- Find a **confidence interval to estimate the average value of Y**.
- Find a **prediction interval to predict one value of Y**.
- Know what **values of X are appropriate** for estimation and prediction.