

# SAINTS OPEN COURSEWARE FOR BUSINESS STUDIES

## Statistics

In this course, you will learn how to organize and summarize data. Organizing and summarizing data is called **descriptive statistics**. Two ways to summarize data are by graphing and by using numbers (for example, finding an average). After you have studied probability and probability distributions, you will use formal methods for drawing conclusions from "good" data. The formal methods are called **inferential statistics**. Statistical inference uses probability to determine how confident we can be that our conclusions are correct. Effective interpretation of data (inference) is based on good procedures for producing data and thoughtful examination of the data. You will encounter what will seem to be too many mathematical formulas for interpreting data.

### Probability

Probability is a mathematical tool used to study randomness. It deals with the chance (the likelihood) of an event occurring. For example, if you toss a fair coin four times, the outcomes may not be two heads and two tails. However, if you toss the same coin 4,000 times, the outcomes will be close to half heads and half tails.

### Statistics

The science of statistics deals with the collection, analysis, interpretation, and presentation of data. We see and use data in our everyday lives. In statistics, we generally want to study a **population**. You can think of a population as a collection of persons, things, or objects under study.

To study the population, we select a **sample**. The idea of sampling is to select a portion (or subset) of the larger population and study that portion (the sample) to gain information about the population. Data are the result of sampling from a population. Because it takes a lot of time and money to examine an entire population, sampling is a very practical technique.

**Reference: CK-12-Probability-and-Statistics-Advanced-Second-Edition\_b\_v20\_51x\_s1**

<b>Chapter 1 An Introduction to Analyzing Statistical Data</b>		Study Material	Revision Notes	Exam Material
1.1 Definitions of Statistical Terminology	1.3 Measures of Center	✓		
1.2 An Overview of Data	1.4 Measures of Spread			
<b>Chapter 2 Visualizations of Data</b>		Study Material	Revision Notes	Exam Material
2.1 Histograms and Frequency Distributions	2.3 Box-and-Whisker Plots	✓		
2.2 Common Graphs and Data Plots				
<b>Chapter 3 - An Introduction to Probability</b>		Study Material	Revision Notes	Exam Material
3.1 Events, Sample Spaces, and Probability	3.4 Conditional Probability	✓		
3.2 Compound Events	3.5 Additive and Multiplicative Rules			
3.3 The Complement of an Event	3.6 Basic Counting Rules			
<b>Chapter 4 - Discrete Probability Distribution</b>		Study Material	Revision Notes	Exam Material
4.1 Two Types of Random Variables	4.4 Sums and Differences of Independent Random Variables	✓		
4.2 Probability Distribution for a Discrete Random Variable				
4.3 Mean and Standard Deviation of Discrete Random Variables				
	4.5 The Binomial Probability Distribution			
	4.6 The Poisson Probability Distribution			
	4.7 Geometric Probability Distribution			
<b>Chapter 5 - Normal Distribution</b>		Study Material	Revision Notes	Exam Material
5.1 The Standard Normal Probability Distribution		✓		
5.2 The Density Curve of the Normal Distribution				
5.3 Applications of the Normal Distribution				

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<b>Chapter 6 - Planning and Conducting an Experiment or Study</b>		Study Material	Revision Notes	Exam Material
6.1 Surveys and Sampling	6.2 Experimental Design	✓		
<b>Chapter 7 - Sampling Distributions and Estimations</b>		Study Material	Revision Notes	Exam Material
7.1 Sampling Distribution	7.3 Confidence Intervals	✓		
7.2 The z-Score and the Central Limit Theorem				
<b>Chapter 8 - Hypothesis Testing</b>		Study Material	Revision Notes	Exam Material
8.1 Hypothesis Testing and the P-Value	8.4 Student's t-Distribution			
8.2 Testing a Proportion Hypothesis	8.5 Testing a Hypothesis for Dependent and Independent Samples	✓		
8.3 Testing a Mean Hypothesis				
<b>Chapter 9 - Regression and Correlation</b>		Study Material	Revision Notes	Exam Material
9.1 Scatterplots and Linear Correlation	9.3 Inferences about Regression	✓		
9.2 Least-Squares Regression	9.4 Multiple Regression			
<b>Chapter 10 - Chi-Square</b>		Study Material	Revision Notes	Exam Material
10.1 The Goodness-of-Fit Test	10.3 Testing One Variance	✓		
10.2 Test of Independence				
<b>Chapter 11 - Analysis of Variance and the F-Distribution</b>		Study Material	Revision Notes	Exam Material
11.1 The F-Distribution and Testing Two Variances	11.2 The One-Way ANOVA Test	✓		
	11.3 The Two-Way ANOVA Test			

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<b>Chapter 12 - Non-Parametric Statistics</b>	Study Material	Revision Notes	Exam Material
12.1 Introduction to Non-Parametric Statistics 12.2 The Rank Sum Test and Rank Correlation 12.3 The Kruskal-Wallis Test and the Runs Test	<u>✓</u>		
<b>Chapter 13 - Advanced Probability and Statistics - Second Edition Resources</b>	Study Material	Revision Notes	Exam Material
13.1 Resources on the Web for Creating Examples and Activities	<u>✓</u>		