Preface

Using and understanding statistics and statistical procedures have become required skills in virtually every profession and academic discipline. The purpose of this book is to help students master basic statistical concepts and techniques and to provide real-life opportunities for applying them.

Audience

*Introductory Statistics* is intended for one- or two-semester courses or for quarter-system courses. Instructors can easily fit the text to the pace and depth they prefer. Introductory high school algebra is a sufficient prerequisite.

Although mathematically and statistically sound (the author has also written books at the senior and graduate levels), the approach does not require students to examine complex concepts. Rather, the material is presented in a natural and intuitive way. Simply stated, students will find this book’s presentation of introductory statistics easy to understand.

About This Book

*Introductory Statistics* presents the fundamentals of statistics, featuring data production and data analysis. Data exploration is emphasized as an integral prelude to statistical inference.

This edition of *Introductory Statistics* continues the book’s tradition of being on the cutting edge of statistical pedagogy, technology, and data analysis. It includes hundreds of new and updated exercises with real data from journals, magazines, newspapers, and websites.

The following Guidelines for Assessment and Instruction in Statistics Education *(GAISE)*, funded and endorsed by the American Statistical Association, are supported and adhered to in *Introductory Statistics*:

- Teach statistical thinking.
- Focus on conceptual understanding.
- Integrate real data with a context and purpose.
- Foster active learning.
- Use technology to explore concepts and analyze data.
- Use assessments to improve and evaluate student learning.

Technology and Other Updates to the Tenth Edition

The book’s technology coverage includes the use of Minitab, Excel, and the TI-83/84 Plus. Instructors can concentrate on one technology or cover and compare two or more technologies.

In addition to the MyLab updates that can be found on pp. xvi–xvii, all of the Technology Center features in this edition have been updated to reflect the latest software releases. The Technology Center is an in-text feature that includes step-by-step instructions for the implementation of each of these three applications.

This edition contains more than 3000 high-quality exercises, which far exceeds what is found in typical introductory statistics books.

The WeissStats Resource Site (aka WeissStats site) provides an extensive array of resources for both instructors and students, including additional topics, applets, all data sets from the book in multiple formats, a procedures booklet, and technology appendixes. In addition to several new items, the site offers universal access to those items formerly included on the WeissStats CD. Refer to the table of contents for a brief list of the contents of the WeissStats site or visit the site at www.pearsonhighered.com/weiss-stats. Note: Resources for instructors only are available on the Instructor Resource Center at www.pearsonhighered.com irc.

Chebyshev’s Rule and the Empirical Rule. Section 3 of Chapter 3 is dedicated to an examination of Chebyshev’s rule and the empirical rule. The empirical rule is further examined in Chapter 6 when the normal distribution is discussed.

Quartiles. The method for calculating quartiles has been modified to make it more easily accessible to students. Furthermore, a dedicated procedure that provides a step-by-step method for finding the quartiles of a data set has been included.

Distribution Shapes. The material on distribution shapes in Section 2.4 has been significantly modified and clarified.
Students will find this revised approach easier to understand and apply.

**Regression Analysis.** Major improvements have been made to the chapter on Descriptive Methods in Regression and Correlation. These improvements include a comprehensive discussion of scatterplots, a simpler introduction to the least-squares criterion, and easier introductory examples for the regression equation, the sums of squares and coefficient of determination, and the linear correlation coefficient.

**Warm-up Exercises.** Hundreds of “warm-up” exercises provide context-free problems that allow students to concentrate solely on the relevant concepts before moving on to applied exercises.

**Density Curves.** The discussion of density curves has been significantly expanded and now includes several examples and many more exercises.

**Type II Error Probabilities and Power.** Section 9.7, which covers Type II error probabilities and power, has undergone major revision, including increased visuals and the addition of procedures for calculating Type II error probabilities and for constructing power curves.

**Note:** See the Technology section of this preface for a discussion of technology additions, revisions, and improvements.

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**Hallmark Features and Approach**

**Chapter-Opening Features.** Each chapter begins with a general description of the chapter, an explanation of how the chapter relates to the text as a whole, and a chapter outline. A classic or contemporary case study highlights the real-world relevance of the material.

**End-of-Chapter Features.** Each chapter ends with features that are useful for review, summary, and further practice.

- **Chapter Reviews.** Each chapter review includes chapter objectives, a list of key terms with page references, and review problems to help students review and study the chapter. Items related to optional materials are marked with asterisks, unless the entire chapter is optional.
- **Focusing on Data Analysis.** This feature lets students work with large data sets, practice technology use, and discover the many methods of exploring and analyzing data. For details, see the introductory Focusing on Data Analysis section on page 34 of Chapter 1.
- **Case Study Discussion.** At the end of each chapter, the chapter-opening case study is reviewed and discussed in light of the chapter’s major points, and then problems are presented for students to solve.
- **Biographical Sketches.** Each chapter ends with a brief biography of a famous statistician. Besides being of general interest, these biographies teach students about the development of the science of statistics.

**Formula/Table Card.** The book’s detachable formula/table card (FTC) contains all the formulas and many of the tables that appear in the text. The FTC is helpful for quick-reference purposes; many instructors also find it convenient for use with examinations.

**Procedure Boxes, Index, and Booklet.** To help students learn how to perform statistical analyses, easy-to-follow, step-by-step procedures have been provided. Each step is highlighted and presented again within the illustrating example. This approach shows how the procedure is applied and helps students master its steps. Additionally:
- A Procedure Index (located near the front of the book) provides a quick and easy way to find the right procedure for performing any statistical analysis.
- A Procedures Booklet (available in the Procedures Booklet section of the WeissStats Resource Site) provides a convenient way to access any required procedure.

**ASA/MAA–Guidelines Compliant.** Introductory Statistics follows American Statistical Association (ASA) and Mathematical Association of America (MAA) guidelines, which stress the interpretation of statistical results, the contemporary applications of statistics, and the importance of critical thinking.

**Populations, Variables, and Data.** Through the book’s consistent and proper use of the terms population, variable, and data, statistical concepts are made clearer and more unified. This strategy is essential for the proper understanding of statistics.

**Data Analysis and Exploration.** Data analysis is emphasized, both for exploratory purposes and to check assumptions required for inference. Recognizing that not all readers have access to technology, the book provides ample opportunity to analyze and explore data without the use of a computer or statistical calculator.

**Parallel Critical-Value/P-Value Approaches.** Through a parallel presentation, the book offers complete flexibility in the coverage of the critical-value and P-value approaches to hypothesis testing. Instructors can concentrate on either approach, or they can cover and compare both approaches. The dual procedures, which provide both the critical-value and P-value approaches to a hypothesis-testing method, are combined in a side-by-side, easy-to-use format.

**Interpretations.** This feature presents the meaning and significance of statistical results in everyday language and highlights the importance of interpreting answers and results.

**You Try It!** This feature, which follows most examples, allows students to immediately check their understanding by working a similar exercise.

**What Does It Mean?** This margin feature states in “plain English” the meanings of definitions, formulas, key facts, and some discussions—thus facilitating students’ understanding of the formal language of statistics.
**Examples and Exercises**

**Real-World Examples.** Every concept discussed in the text is illustrated by at least one detailed example. Based on real-life situations, these examples are interesting as well as illustrative.

**Real-World Exercises.** Constructed from an extensive variety of articles in newspapers, magazines, statistical abstracts, journals, and websites, the exercises provide current, real-world applications whose sources are explicitly cited.

New to this edition, a fourth category of exercises has been added, namely, Applying the Concepts and Skills. As a consequence, the exercise sets are now divided into the following four categories:

- *Understanding the Concepts and Skills* exercises help students master the basic concepts and skills explicitly discussed in the section. These exercises consist of two types: (1) Non-computational problems that test student understanding of definitions, formulas, and key facts; (2) “warm-up” exercises, which require only simple computations and provide context-free problems that allow students to concentrate solely on the relevant concepts before moving on to applied exercises. For pedagogical reasons, it is recommended that warm-up exercises be done without the use of a statistical technology.

- *Applying the Concepts and Skills* exercises provide students with an extensive variety of applied problems that hone student skills with real-life data. These exercises can be done with or without the use of a statistical technology, at the instructor’s discretion.

- *Working with Large Data Sets* exercises are intended to be done with a statistical technology and let students apply and interpret the computing and statistical capabilities of Minitab®, Excel®, the TI-83/84 Plus®, or any other statistical technology.

- *Extending the Concepts and Skills* exercises invite students to extend their skills by examining material not necessarily covered in the text. These exercises include many critical-thinking problems.

**Notes:** An exercise number set in cyan indicates that the exercise belongs to a group of exercises with common instructions. Also, exercises related to optional materials are marked with asterisks, unless the entire section is optional.

**Organization**

*Introductory Statistics* offers considerable flexibility in choosing material to cover. The following flowchart indicates different options by showing the interdependence among chapters; the prerequisites for a given chapter consist of all chapters that have a path that leads to that chapter.

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Technology Resources

Technology Appendixes. The appendixes for Excel, Minitab, and the TI-83/84 Plus introduce the three statistical technologies, explain how to input data, and discuss how to perform other basic tasks. They are entitled *Getting Started with …* and are located in the Technology Basics section of the WeissStats Resource Site, www.pearsonhighered.com/weiss-stats.

Built-in Technology Manuals. The Technology Center features (in the book) and the technology appendixes (on the WeissStats site) make it unnecessary for students to purchase technology manuals. Students who will be using Minitab, Excel, or the TI-83/84 Plus to solve exercises should study the appropriate technology appendix(es) before commencing with the Technology Center sections.

TI Programs. The TI-83/84 Plus does not have built-in applications for a number of the statistical analyses discussed in the book. So that users of the TI-83/84 Plus can do such analyses with their calculators, the author has made available TI programs. Those programs are obtainable from the TI Programs section of the WeissStats Resource Site.

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MyLab Statistics Revision for *Introductory Statistics, 10e* (access code required)

MyLab™ Statistics is available to accompany Pearson’s market-leading text offerings. To give students a consistent tone, voice, and teaching method, each text’s flavor and approach is tightly integrated throughout the accompanying MyLab Statistics course, making learning the material as seamless as possible. This updated version of the tenth edition includes a MyLab revision with the following enhancements:

**StatCrunch Reports**
StatCrunch Reports get students hands-on with statistical procedures by guiding them through real data analysis in StatCrunch. When results are generated with just a few clicks, students can spend more time interpreting and communicating results. StatCrunch Reports are integrated into the text and now include assignable questions in MyLab Statistics.

**NEW! StatCrunch Projects**
StatCrunch Projects provide opportunities for students to explore data beyond the classroom. In each project, students analyze a data set in StatCrunch® and answer assignable MyLab questions for immediate feedback. StatCrunch Projects span the entire curriculum or focus on certain key concepts. Questions from each project can also be assigned individually.

**UPDATED! Interactive Applets**
Interactive applets are a powerful tool for exploring statistical concepts and enhancing understanding. All text-specific applets for *Introductory Statistics* were updated and converted to HTML5 making them more user friendly. These applets join the existing suite of interactive applets that are available in StatCrunch. Now with assignable exercises.

[pearson.com/mylab/statistics](https://pearson.com/mylab/statistics)
Resources for Success

Instructor Resources

Instructor’s Edition

Instructor’s Solutions Manual
Written by Toni Garcia (George Mason University), the Instructor’s Solutions Manual contains worked-out solutions to all text exercises. It can be downloaded from MyLab Statistics or from www.pearson.com.

PowerPoint Lecture Slides
Slides feature key graphics, concepts, and definitions from this text. These files can be downloaded from within MyLab Statistics or from www.pearson.com.

TestGen
TestGen® (www.pearson.com/testgen) enables instructors to build, edit, print, and administer tests using a computerized bank of questions developed to cover all the objectives of the text. TestGen is algorithmically based, allowing instructors to create multiple but equivalent versions of the same question or test with the click of a button. Instructors can also modify test bank questions or add new questions. The software and test bank are available for download from pearson.com. The questions are also assignable in MyLab Statistics.

Learning Catalytics
Now included in all MyLab Statistics courses, this student response tool uses students’ smartphones, tablets, or laptops to engage them in more interactive tasks and thinking during lecture. Learning Catalytics™ fosters student engagement and peer-to-peer learning with real-time analytics. Access prebuilt exercises created specifically for statistics.

Question Libraries
In addition to StatCrunch Projects, MyLab Statistics also includes a Getting Ready for Statistics library that contains more than 450 exercises on prerequisite topics and a Conceptual Question Library with 1,000 questions that assess conceptual understanding.

Minitab and Minitab Express™
Bundling Minitab software with educational materials ensures students have access to the software they need in the classroom, around campus, and at home. And having 12-month access to Minitab and Minitab Express ensures students can use the software for the duration of their course. ISBN 13: 978-0-13-445640-9 ISBN 10: 0-13-445640-8

Statistical Software Support
Instructors and students can copy data sets from the text and MyLab Statistics exercises directly into software such as StatCrunch or Excel®. Students can also access instructional support tools including tutorial videos, Study Cards, and manuals for a variety of statistical software programs including, StatCrunch, Excel, Minitab®, JMP®, R, SPSS, and TI-83/84 calculators.

StatCrunch
StatCrunch® is powerful web-based statistical software that allows users to collect, crunch, and communicate with data. The vibrant online community offers tens of thousands of shared data sets for students and instructors to analyze, in addition to all of the data sets in the text or online homework. StatCrunch is integrated directly into MyLab Statistics or it can be purchased separately. Learn more at www.statcrunch.com.

Student Resources

JMP Student Edition
An easy-to-use, streamlined version of JMP desktop statistical discovery software from SAS Institute, Inc. is available for bundling with the text.

XLSTAT™
An Excel add-in that enhances the analytical capabilities of Excel. XLSTAT is used by leading businesses and universities around the world. It is available to bundle with this text. For more information go to www.pearsonhighered.com/xlstat/.

XLSTAT™
An easy-to-use, streamlined version of XLSTAT software from Addinsoft, Inc. is available for bundling with the text.

Student’s Solutions Manual
Written by Toni Garcia (George Mason University), this manual provides detailed, worked-out solutions to all odd-numbered section exercises and all Review Problems. It is available in print and can be downloaded from MyLab Statistics.

Data Sets
All data sets from the textbook are available in MyLab Statistics and at www.pearsonhighered.com/weiss-stats. They can be analyzed in StatCrunch or downloaded for use in other statistical software programs.

Statistical Software Support
Instructors and students can copy data sets from the text and MyLab Statistics exercises directly into software such as StatCrunch or Excel®. Students can also access instructional support tools including tutorial videos, Study Cards, and manuals for a variety of statistical software programs including, StatCrunch, Excel, Minitab®, JMP®, R, SPSS, and TI-83/84 calculators.

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