

The background of the book cover is a stylized bar chart. The bars are vertical and have jagged, irregular tops. They are colored in a sequence of dark red, teal, and brown. A thick, solid yellow curve, resembling a normal distribution curve, arches over the bars. The overall texture is grainy and artistic.

MARIO F. TRIOLA

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ELEMENTARY  
STATISTICS  
THIRD EDITION

**T H I R D   E D I T I O N**

# Elementary Statistics

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**Mario F. Triola**

Dutchess Community College, Poughkeepsie, New York



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# Preface

## **Purpose of This Book**

With the proliferation and widespread availability of calculators and computers, the importance and use of statistics are continuously increasing. Each of our lives is now affected in many ways by the analysis and management of data. The educated citizen and worker can no longer evade the challenges posed by our data-oriented society. This book is designed to develop the insight and skills needed to confront those challenges.

## **Audience**

This book is an introduction to elementary statistics for nonmathematics students. A strong mathematics background is not required, but students should have completed a high school algebra course. Although this book does include underlying theory, it does not include the mathematical rigor more suitable for mathematics majors.

In writing this book, strong emphasis was placed on interesting, clear, and readable writing. Because the many examples and exercises in this book cover a wide variety of applications, it is appropriate for many disciplines. The previous editions have been used successfully by majors in psychology, sociology, business, data processing, computer science, engineering technology, biology, education, nursing, health, economics, ecology, agriculture, and many others.

## **Changes in the Third Edition**

This third edition of *Elementary Statistics* includes all of the basic features of the previous editions. In response to extensive reader sur-

veys, some sections have been added and almost every section has been modified to some extent. Also, several new features have been added:

### Beginning of Chapter Features

- (New) List of **chapter sections** along with brief descriptions of their contents
- (New) Presentation of a **chapter problem**
- **Overview** of chapter including statement of objectives

### End of Chapter Features

- **Computer project**
- **Review** of chapter
- (New) List of **important formulas**
- (New) **Vocabulary list** of important terms introduced in the chapter
- **Review Exercises**
- (New) **Case study activity**

### Major Content Changes

- New section in Chapter 1: *The Nature of Data*. Includes discussion of nominal, ordinal, interval, and ratio levels of measurement.
- New optional section in Chapter 3: *Counting*. Includes permutations and combinations.
- New optional section in Chapter 6: *P-Values*.
- Inclusion of *stem-and-leaf plots* in Section 2-3.
- Inclusion of *box-and-whisker diagrams* in Section 4-6.
- Analysis of variance expanded to include treatment of samples with unequal sizes.

### Exercises

The number of exercises has been substantially increased. There are now more than 1400 exercises, an increase of 40%. Also, a major effort has been made to group and arrange exercises so that there is usually an even-numbered exercise similar to each odd-numbered exercise.

As in the previous editions, the exercises are arranged in order of increasing difficulty. The exercises are divided into groups A and B, with the B types involving larger data sets or concepts requiring a stronger mathematical background. In a few rare cases, the B exercises introduce a new concept.

The exercise sets apply to a variety of real situations including this small sampling of topics:

X-ray radiation	Nuclear power
Energy consumption in homes	Consumer credit
Gasoline rationing	The reliability of computers



Blood cholesterol levels	Chemical reactions
Reliability of instrument readings	Income taxes
I.Q. tests	Fuel consumption rates
Car fatality rates for different age groups	Product testing
Effectiveness of fire detecting devices	Extrasensory perception
Surveys, polls, and the census	Biofeedback experiments
	Campaign strategy
	Gun control
	Police response time

## Other Features

- The **flowcharts** help clarify the more complicated procedures.
- Appendix B contains an expanded **glossary** of important terms.
- Appendix C contains an updated **bibliography**.
- Appendix D contains **answers** to almost all of the odd-numbered exercises.
- A **symbol table** is included on the front inside cover for quick and easy reference to key symbols.
- There are many more of the very popular **margin essays**. These short essays illustrate uses of statistics in very real and practical applications. The following is a sample of some of the topics covered.

*Advertising:* How commercials are regulated.

*Biology:* Were Mendel's experimental data manipulated?

*Business:* How airlines used sampling to save money by determining revenues from split-ticket sales.

*Criminology:* How valid are crime statistics?

*Economics:* How unemployment figures are obtained.

*Education:* Whether SAT scores can predict career success.

*Energy:* Quality control in a nuclear power plant.

*Entertainment:* How the Nielsen T.V. rating system works.

*Medicine:* How the Salk vaccine was tested.

*Psychology:* How to measure a seemingly qualitative characteristic, such as disobedience.

*Sociology:* Code of ethics for survey research.

*Sports:* Statistics and baseball strategy.

## Supplements

### STATDISK: A Computer Supplement

*Elementary Statistics* does not require the use of computers. For those who choose to supplement their course with computers, we have included

**computer projects** at the end of Chapters 2 through 11. Also, there are two new supplements available with this third edition.

- **STATDISK** is an easy-to-use statistical software package that does not require any previous computer experience. Developed as a supplement to this textbook, **STATDISK** is available for the IBM PC and the Apple IIe systems.
- **STATDISK MANUAL/WORKBOOK** includes instructions on the use of the **STATDISK** software package. It also includes experiments to be conducted by students.

The **STATDISK** software and Manual/Workbook have been designed so that instructors can assign computer experiments without using classroom time that is already quite limited. **STATDISK** includes a wide variety of programs that can be used throughout the course, and the experiments are designed to do more than number crunch or duplicate text exercises. They include concepts that can be discovered through computer use. Also, the text includes several sample displays that result from the use of **STATDISK**.

### Other Supplements

The **Instructor's Resource Guide** includes

- answers to almost all of the text exercises
- test bank with sample tests for each chapter and comprehensive final examinations
- data sets that can be assigned to individual students
- transparency masters

The **Student Solutions Manual** provides detailed worked-out solutions to selected text exercises.

### Acknowledgments

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## To the Student

I recommend the use of a hand calculator. You should get one that is capable of addition, subtraction, multiplication, division, and computation of square roots, and it should use algebraic logic instead of chain logic. You can identify the type of logic by pressing these buttons:

$$2 + 3 \times 4 =$$

If the result is 14, the calculator uses algebraic logic. If the result is 20, the calculator uses chain logic, and you will be likely to make gross errors. Some relatively inexpensive calculators automatically compute the mean and the standard deviation and the slope and intercept values of a regression line. Although a calculator may not be required for the course, one will certainly make your life easier.

I also recommend that you read the overview carefully when you begin a chapter. Read the next section quickly to get a general idea of the material, and then return for a careful second reading. Try the exercises. If you encounter difficulty, go back and work some of the examples in the text and compare your solutions with the ones in the text.

When working on assignments, first attempt the earlier odd-numbered exercises. Check your answers with Appendix D and verify that you are correct before moving on to the other exercises. Keep in mind that neat and well-organized written assignments tend to be viewed more favorably. When you finish a chapter, check the review section to make sure that you didn't miss any major topics. Before taking tests, do the review exercises at the end of the chapters. In addition to helping you review, this will help you with your approach to an assortment of problems.

You might consider buying the *Student Solutions Manual* for this text. Written by Donald K. Mason of Elmhurst College, it gives detailed solutions to many of the text exercises.

M.F.T.  
LaGrange, New York  
January, 1986

# Contents

## CHAPTER 1

### Introduction to Statistics

	2
Chapter Problem	3
<b>1-1</b> Overview	4
<b>1-2</b> Background	4
<b>1-3</b> Uses and Abuses of Statistics	7
<b>1-4</b> The Nature of Data	11
Vocabulary List	16
Exercises	16
Case Study Activity	19

## CHAPTER 2

### Descriptive Statistics

	21
Chapter Problem	21
<b>2-1</b> Overview	22
<b>2-2</b> Summarizing Data	23
Exercises A	30
Exercises B	34
<b>2-3</b> Pictures of Data	35
Pie Charts	35

<i>Histograms</i>	37
<i>Frequency Polygons</i>	38
<i>Ogives</i>	38
<i>Stem-and-Leaf Plots</i>	40
<i>Miscellaneous Graphics</i>	43
Exercises A	44
Exercises B	49
<b>2-4</b> Averages	50
<i>Mean</i>	51
<i>Median</i>	53
<i>Mode</i>	54
<i>Midrange</i>	55
<i>Weighted Mean</i>	55
Exercises A	59
Exercises B	62
<b>2-5</b> Dispersion Statistics	64
<i>Range</i>	65
<i>Variance</i>	66
<i>Standard Deviation</i>	70
Exercises A	73
Exercises B	77
<b>2-6</b> Measures of Position	79
Exercises A	84
Exercises B	86
Computer Project:	
Descriptive Statistics	86
Review	87

Important Formulas	88
Vocabulary List	88
Review Exercises	89
Case Study Activity	90

## C H A P T E R 3

### Probability 92

Chapter Problem	93
<b>3-1</b> Overview	94
<b>3-2</b> Fundamentals	96
<i>Rounding Off Probabilities</i>	103
Exercises A	104
Exercises B	108
<b>3-3</b> Addition rule	108
Exercises A	115
Exercises B	118
<b>3-4</b> Multiplication Rule	119
Exercises A	126
Exercises B	129
<b>3-5</b> Complementary Events	130
Exercises A	133
Exercises B	135
<b>3-6</b> Counting	136
Exercises A	143
Exercises B	145
Computer Project: Probability	146
Review	147
Important Formulas	149
Vocabulary List	150
Review Exercises	150
Case Study Activity	153

## C H A P T E R 4

### Probability Distributions 154

Chapter Problem	155
<b>4-1</b> Overview	156

<b>4-2</b> Random Variables	156
<i>Discrete Random Variables</i>	158
Exercises A	162
Exercises B	164
<b>4-3</b> Mean, Variance, and Expectation	165
<i>Expected Value</i>	167
Exercises A	169
Exercises B	172
<b>4-4</b> Binomial Experiments	173
Exercises A	184
Exercises B	187
<b>4-5</b> Mean and Standard Deviation for the Binomial Distribution	188
Exercises A	193
Exercises B	194
<b>4-6</b> Distribution Shapes	195
Exercises A	203
Exercises B	205
Computer Project:	
Probability Distributions	206
Review	207
Important Formulas	207
Vocabulary List	208
Review Exercises	208
Case Study Activity	212

## C H A P T E R 5

### Normal Probability Distributions 214

Chapter Problem	215
<b>5-1</b> Overview	216
<b>5-2</b> The Standard Normal Distribution	217
Exercises A	223
Exercises B	224
<b>5-3</b> Nonstandard Normal Distributions	225
Exercises A	229
Exercises B	232
<b>5-4</b> Finding Scores When Given Probabilities	233
Exercises A	236
Exercises B	238

<b>5-5</b>	Normal as Approximation to Binomial	239
	Exercises A	247
	Exercises B	249
<b>5-6</b>	The Central Limit Theorem	249
	Exercises A	258
	Exercises B	261
	Computer Project: Normal Probability Distributions	261
	Review	262
	Important Formulas	263
	Vocabulary List	264
	Review Exercises	264
	Case Study Activity	266

## CHAPTER 6

	<b>Testing Hypotheses</b>	266
	Chapter Problem	267
<b>6-1</b>	Overview	268
<b>6-2</b>	Testing a Claim About a Mean	269
	Exercises A	284
	Exercises B	287
<b>6-3</b>	P-Values	289
	Exercises A	293
	Exercises B	294
<b>6-4</b>	<i>t</i> Test	295
	Exercises A	304
	Exercises B	307
<b>6-5</b>	Tests of Proportions	307
	Exercises A	313
	Exercises B	315
<b>6-6</b>	Tests of Variances	315
	Exercises A	321
	Exercises B	324
	Computer Project: Testing Hypotheses	325
	Review	325
	Important Formulas	326
	Vocabulary List	327
	Review Exercises	327
	Case Study Activity	329

## CHAPTER 7

	<b>Estimates and Sample Sizes</b>	330
	Chapter Problem	331
<b>7-1</b>	Overview	332
<b>7-2</b>	Estimates and Sample Sizes of Means	332
	<i>Determining Sample Size</i>	337
	<i>Small Sample Cases</i>	339
	Exercises A	340
	Exercises B	343
<b>7-3</b>	Estimates and Sample Sizes of Proportions	345
	<i>Sample Size</i>	348
	Exercises A	352
	Exercises B	354
<b>7-4</b>	Estimates and Sample Sizes of Variances	355
	Exercises A	360
	Exercises B	361
	Computer Project: Estimates and Sample Sizes	362
	Review	362
	Important Formulas	363
	Vocabulary List	364
	Review Exercises	364
	Case Study Activity	366

## CHAPTER 8

	<b>Tests Comparing Two Parameters</b>	368
	Chapter Problem	369
<b>8-1</b>	Overview	370
<b>8-2</b>	Tests Comparing Two Variances	370
	Exercises A	375
	Exercises B	376
<b>8-3</b>	Tests Comparing Two Means	377

Exercises A	392
Exercises B	398
<b>8-4</b> Tests Comparing Two Proportions	399
Exercises A	405
Exercises B	407
Computer Project: Tests	
Comparing Two Parameters	408
Review	409
Important Formulas	410
Review Exercises	411
Vocabulary List	415
Case Study Activity	415

## CHAPTER 9

### Correlation and Regression

Chapter Problem	417
<b>9-1</b> Overview	418
<b>9-2</b> Correlation	419
Exercises A	428
Exercises B	432
<b>9-3</b> Regression	433
Exercises A	444
Exercises B	447
<b>9-4</b> Variation	448
Exercises A	454
Exercises B	455
Computer Project: Correlation	
and Regression	456
Review	456
Important Formulas	457
Review Exercises	457
Vocabulary List	459
Case Study Activity	459

## CHAPTER 10

### Chi-Square and Analysis of Variance

Chapter Problem	461
-----------------	-----

<b>10-1</b> Overview	462
<b>10-2</b> Multinomial Experiments	462
Exercises A	468
Exercises B	471
<b>10-3</b> Contingency Tables	472
Exercises A	478
Exercises B	482
<b>10-4</b> Analysis of Variance	483
Exercises A	492
Exercises B	496
Computer Project: Chi-Square	
and Analysis of Variance	497
Review	497
Important Formulas	498
Review Exercises	499
Vocabulary List	501
Case Study Activity	501

## CHAPTER 11

### Nonparametric Statistics

Chapter Problem	503
<b>11-1</b> Overview	504
<i>Advantages of Nonparametric Methods</i>	504
<i>Disadvantages of Nonparametric Methods</i>	504
<b>11-2</b> Sign Test	506
Exercises A	513
Exercises B	516
<b>11-3</b> Wilcoxon Signed-Ranks Test for	
Two Dependent Samples	517
Exercises A	521
Exercises B	524
<b>11-4</b> Wilcoxon Rank-Sum Test for	
Two Independent Samples	525
Exercises A	529
Exercises B	532
<b>11-5</b> Kruskal-Wallis Test	533
Exercises A	537
Exercises B	540
<b>11-6</b> Rank Correlation	540
Exercises A	549
Exercises B	552

<b>11-7</b>	Runs Test for Randomness	553	<i>Random Sampling</i>	574
	Exercises A	562	<i>Stratified Sampling</i>	575
	Exercises B	565	<i>Systematic Sampling</i>	575
	Computer Project: Nonparametric Statistics	565	<i>Cluster Sampling</i>	576
	Review	565	<i>Importance of Sampling</i>	576
	Important Formulas	566	<b>12-3</b>	Analyzing Data and Drawing Conclusions
	Review Exercises	567		577
	Vocabulary List	570	<b>12-4</b>	Writing the Report
	Case Study Activity	570		577
			<b>12-5</b>	A Do-It-Yourself Project
				578
			Exercises A	579
			Exercises B	580

## CHAPTER 12

### Design, Sampling, and Report Writing

	Identifying Objectives	573	<b>Appendix A:</b>	Tables	A1
<b>12-1</b>	Designing the Experiment	574	<b>Appendix B:</b>	Glossary	A25
<b>12-2</b>	Sampling and Collecting Data	574	<b>Appendix C:</b>	Bibliography	A30
			<b>Appendix D:</b>	Answers to Selected Exercises	A32
			<b>Index</b>		A80



# Essays

## CHAPTER 1

Airline Companies Save by Sampling	5
Hertz and AAA Disagree on Car Costs	8
The Mt. St. Helens Myth	10
How Do You Measure Disobedience?	14

## CHAPTER 2

The Census	25
Authors of the <i>Federalist</i> Papers Identified	28
Histograms Can Be Revealing	37
Children See Much Television Violence	41
Over Half Our Presidents Are Above Average	52
The Class Size Paradox	56
United States Government Eliminates 500,000 Farms	70
Index Numbers	80

## CHAPTER 3

Long-Range Weather Forecasting	95
Should You Guess on SAT's?	98
Mathematician Predicts Date of His Death	101
Just How Probable Is Probable?	102

You Bet?	109
Monkeys Are Not Likely to Type <i>Hamlet</i>	113
Probability and Prosecution	114
Nuclear Power Plant Has Unplanned "Event"	120
Convicted by Probability	122
Multiplication Rule Presents Difficulty to FAA	124
Redundancy	125
Not Too Likely	130
Odds Can Be Odd	132
Safety in Numbers	139
The Number Crunch	142

## CHAPTER 4

How Not to Pick Lottery Numbers	159
Prophets for Profits	168
Is Parachuting Safe?	174
Detecting Syphilis	183
Who Is Shakespeare?	190
Clusters of Disease	202

## CHAPTER 5

Bullhead City Gets Hotter	227
---------------------------	-----

Are Geniuses Peculiar?	235
Reliability and Validity	252

## **CHAPTER 6**

Why Professional Articles Are Rejected	270
Drug Approval Requires Strict Procedure	273
Product Testing Is Big Business	279
Beware of P-Value Misuse	291
Commercials, Commercials, Commercials	302
Misleading Statistics	308
Quality Control in a Nuclear Power Plant	310
The Power of Your Vote	319

## **CHAPTER 7**

Technology Clouds Television Ratings	333
The Nielsen Television Rating System	335
Excerpts from a Department of Transportation Circular	336
A Professional Speaks About Sampling Error	339
Large Sample Size Is Not Good Enough	349
How One Telephone Survey Was Conducted	351
TV Watching Sets Records	358

## **CHAPTER 8**

Cheating Success	371
Exit Polls on Their Way Out?	372
More Police, Fewer Crimes?	374
The Gender Gap in Wages	378
How Valid Are Crime Statistics?	386
The Golden Gate to Heaven	400
Polio Experiment	404

## **CHAPTER 9**

Correlation Shows Trend	420
Student Ratings of Teachers	422

Have Atomic Tests Caused Cancer?	425
Unusual Economic Indicators	436
Rising to New Heights	442
What SAT Scores Measure	450

## **CHAPTER 10**

Did Mendel Fudge His Data?	464
Of Course, Your Mileage May Vary	466
Survey Solicits Contributions	474
High Hopes	476
Statistics and Baseball Strategy	484
ZIP Codes Reveal Much	486
Pollster Lou Harris	491

## **CHAPTER 11**

Air Is Healthier Than Tobacco	508
How Valid Are Unemployment Figures?	520
The Case of Coke versus Pepsi	528
Seat Belts Save Lives	536
Does Television Watching Cause Violence?	541
Study Criticized as Misleading	544
Dangerous to Your Health	548
Magazine Survey Results Reflect Leadership	554
Uncle Sam Wants You, if You're Randomly Selected	557
Consumer Price Index as a Measure of Inflation	561

## **CHAPTER 12**

Survey Medium Can Affect Results	575
Phone Surveys	575
Invisible Ink Deceives Subscribers	576
Code of Ethics for Survey Research	578
Ethics in Experiments	579

**T H I R D   E D I T I O N**

# **Elementary Statistics**