

Preparing For Algebra and Statistics

(Third Edition)

By Matt Teachout

**College of the Canyons
Santa Clarita, CA, USA**

*The 3rd edition of Preparing for Algebra and Statistics was released
in August 2016 under the following licensing:*



***This content is licensed under a Creative Commons
Attribution 4.0 International license***

Special thanks to all of the people that made this book possible.

**Especially Kelly Aceves, Dustin Silva, Ambika Silva,
Kathy Kubo, Collette Gibson, Joe Gerda, Sab Matsumoto,
Angela Grigoryan, Jeremy Goodman, James Glapa-Grossklag,
Brian Weston, Jim Gilmore, Akemi Tyler, Morgan Cole, Mindy Albee,
the incredible COC math department and faculty, OER office,
reprographics, and the rest of the COC faculty and staff.**

Your help and support made this possible.

**I would also like to thank my wife Link
and my daughters Kayla and Kianna.
You are my inspiration.**

Introduction

This book was written to combine arithmetic and pre-algebra in order to prepare students for algebra and statistics pathways. The goal of the book is to prepare students not only for beginning algebra (algebra I) courses, but also to prepare students for pre-statistics courses. It was written for students and is for educational use only. This book is not meant to teach someone a concept from scratch, but instead to remind students of material they hopefully have seen before in previous math courses and merely forgotten. Students are welcome to use the digital version of the book on their computer or e-reader, but the book can also be printed and written in. Every section has completed examples as well as example problems to work out with their instructor. Students should take notes in the open regions that say “Do this example with your instructor.” Therefore the book is more of a “workbook” than a textbook and should be used in conjunction with taking a pre-algebra level course. Because the book also prepares students for pre-stat courses, there are quite a few statistics applications and formulas throughout the book. If you are not familiar with some of the letters we use in statistics formulas, here are some of the common ones.

z : “z-score” (Used for comparing quantities in statistics.)

μ : Greek letter “mu”. (Used to represent a population mean average.)

\bar{x} : “x-bar” (Used to represent the mean average of sample data.)

σ : Greek letter “sigma”. (Used to represent a population standard deviation.)

s : (Used to represent the standard deviation of sample data.)

p : (Used to represent a population percentage.)

\hat{p} : “p – hat” (Used to represent a percentage of sample data.)

Special Note for Teachers

I hope this book is useful for you and your students. As I stated above, this book is a resource for the students but should be used in conjunction with receiving instruction from their pre-algebra teacher. I believe that students never learn well from a textbook alone. They need the help and support of a great teacher. Besides having completed examples and explanations of concepts, the book also has space for “instructor examples”, where I want the students to complete the example problem with their teacher and take notes. They will receive better explanation from their teacher than I could ever give in a textbook. Teaching is an art that is incredibly difficult and not always appreciated. I salute your passion and dedication to your students. That is where the real learning begins.

Matt Teachout

Notes about the 3rd edition

After using the 2nd edition of *Preparing for Algebra and Statistics* in the fall semester of 2015 and the spring semester of 2016, COC pre-algebra instructors made changes in order to better serve their students. This new 3rd edition is very similar to the 2nd edition. Changes include a new section on calculating basic statistics (section 2G), a new section on inequalities (section 5G), and bar graphs and pie charts have been added to the section on percentages (section 6B). The 3rd edition also has longer homework sets and answer keys to odd problems in appendix A. Thanks to all of the COC pre-algebra and pre-statistics instructors who contributed during the fall 2015 and spring 2016 semesters.

Notes about OER and Creative Commons Licensing

Many college students across the country struggle to balance work and family with their education. One of the biggest road-blocks to many students is the cost of textbooks. At our college, a significant percentage of students cannot afford the cost of textbooks and chose to attend classes without purchasing a book or materials needed for the class. It goes without saying that this is a major impediment to passing their classes, but the students have no choice. They simply cannot afford \$150-\$200 textbooks. For this reason, I believe strongly in open educational resources (OER). Open source materials like this book are available and are virtually free for students.

This textbook is licensed through Creative Commons as “Attribution CC-BY”. Creative Commons describes this license as follows: “This license lets others distribute, remix, tweak, and build upon (the author’s) work, even commercially, as long as they (give) credit (to the author) for the original creation.” This is the most accommodating of licenses offered. Recommended for maximum dissemination and use of licensed materials.” If you need to see the license deed or legal code, please go to <https://creativecommons.org/licenses/> and look under the “CC-By” section.

Table of Contents

Ch.1 - Formulas and Whole Numbers *(pages 7-24)*

Section 1A – Formulas with Adding and Subtracting Whole Numbers *(pages 7-10)*

Section 1B – Formulas with Multiplying Whole Numbers and Positive Exponents *(pages 11-14)*

Section 1C – Formulas with Dividing Whole Numbers *(pages 15-19)*

Section 1D – Formulas with Square Roots and Order of Operations *(pages 20-22)*

Chapter 1 Review *(pages 23-24)*

Ch.2 – Formulas and Decimals *(pages 25-58)*

Section 2A – Rounding, Comparing, Adding and Subtracting Decimals *(pages 25-30)*

Section 2B – Formulas with Exponents and Multiplying Decimals *(pages 31-33)*

Section 2C – Formulas with Dividing Decimals *(pages 34-38)*

Section 2D – Important Application – Scientific Notation *(pages 39-41)*

Section 2E – Significant Figures and Rules for Rounding *(pages 42-45)*

Section 2F – Estimating Square Roots and Order of Operations with Decimals *(pages 46-49)*

Section 2G – Basic Statistic Calculations – Mean, Median and Range *(pages 50-54)*

Chapter 2 Review *(pages 55-58)*

Chapter 3 – Formulas and Fractions *(pages 59-91)*

Section 3A – Fractions and Mixed Number Conversions *(pages 59-62)*

Section 3B – Simplifying and Equivalent Fractions *(pages 63-66)*

Section 3C – Decimal and Fractions Conversions *(pages 67-70)*

Section 3D – Formulas with Multiplying and Dividing Fractions *(pages 71-74)*

Section 3E – Formulas with Multiplying and Dividing Mixed Numbers *(pages 75-77)*

Section 3F – Unit Conversions *(pages 78-82)*

Section 3G – Adding and Subtracting Fractions *(pages 83-85)*

Section 3H – Adding and Subtracting Mixed Numbers *(pages 86-88)*

Chapter 3 Review *(pages 89-91)*

Chapter 4 – Formulas and Negative Numbers *(pages 92-108)*

Section 4A – Negative Quantities and Absolute Value *(pages 92-94)*

Section 4B – Adding Negative Quantities *(pages 95-97)*

Section 4C – Subtracting Negative Quantities *(pages 98-100)*

Section 4D – Multiplying and Dividing Negative Quantities *(pages 101-103)*

Section 4E – Exponents and Order of Operations with Negative Quantities *(pages 104-106)*

Chapter 4 Review *(pages 107-108)*

Chapter 5 – Simplifying Formulas and Solving Equations (pages 109-151)

Section 5A – Simplifying Formulas and Like Terms (pages 109-112)

Section 5B – Multiplying Terms with Associative and Distributive Properties (pages 113-116)

Section 5C – Solving Equations with the Addition Property (pages 117-119)

Section 5D – Solving Equations with the Multiplication Property of Equality (pages 120-122)

Section 5E – Steps to Solving General Linear Equations (pages 123-130)

Section 5F – Solving Proportions (pages 131-133)

Section 5G – Reading, Understanding, Solving and Graphing Inequalities (pages 134-146)

Chapter 5 Review (pages 147-151)

Chapter 6 – Equation Applications (pages 152-188)

Section 6A – Formula Applications (pages 152-156)

Section 6B – Bar Graphs, Pie Charts and Percent Applications (pages 157-168)

Section 6C – Commission, Interest, Tax, Markup and Discount (pages 169-175)

Section 6D – Classic Algebraic Problem Solving (pages 176-182)

Chapter 6 Review (pages 183-188)

Chapter 7 – Equation of a Line, Slope and Rectangular Coordinates (pages 189-269)

Section 7A – Rectangular Coordinate System and Scatterplots (pages 189-199)

Section 7B – Slope of a Line and Average Rates of Change (pages 200-219)

Section 7C – Finding the Equation of a Line (pages 220-241)

Section 7D – Systems of Linear Equations (pages 242-251)

Chapter 7 Review (pages 252-269)

Appendix A: Answer Keys to various Problem Sets (pages 270-298)

Chapter 1 Answers (pages 270-271 , odd answers only)

Chapter 2 Answers (pages 271-273 , odd answers only)

Chapter 3 Answers (pages 274-277 , odd answers only)

Chapter 4 Answers (pages 278-280 , odd and even answers)

Chapter 5 Answers (pages 281-286 , odd answers only)

Chapter 6 Answers (pages 287-288 , odd answers only)

Chapter 7 Answers (pages 289-298, odd answers for 7A-7C only)