

Pharmacy Calculations:

An Introduction for Pharmacy Technicians

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Preface

As students enter into the study of pharmacy, they soon discover that it is a dynamic field where the roles of the pharmacist and pharmacy technician change regularly. This dynamism creates interest and opportunity for students who apply themselves. But even as the field changes, some things remain constant. The safety of patients is of paramount importance to anyone working in pharmacy, whether in hospital, retail, or institutional practices. A thorough understanding of basic pharmacy math and the ability to accurately perform computations continues to be a foundational skill for becoming the qualified, competent pharmacy technician that is always in demand.

This textbook is designed for pharmacy technician students enrolled in a training program, for technicians reviewing for the certification exam, and for on-site training in the workplace. It provides a complete review of the basic mathematics concepts and skills upon which a more advanced understanding of pharmacy-related topics must be built. Once the basic skills are reviewed, the student is guided through the pharmacy basics necessary for correctly interpreting prescriptions and drug orders, and performing dosing calculations that technicians face in practice.

The goal in writing this text was to demystify pharmacy math, even for “math-phobic” students, by providing a stepwise approach from simple to complex pharmacy math problems built on a strong foundation of basics. After many years of teaching mathematics and pharmacy mathematics, the authors are aware that different students may connect with different approaches to math solutions. Therefore, when appropriate, different techniques for solutions are discussed.

Organization and Contents

The chapters and units of this text are organized to complement most pharmacy technician training curricula and to support the ASHP model curriculum. The chapters are divided into four units. Units progress from general and basic concepts to more specific and complex concepts.

- Unit 1, Review of Mathematics, provides an introduction to the world of pharmacy, including medication error avoidance. A complete review of foundational concepts and basic math operations follows, with an emphasis on how these concepts relate to pharmacy error prevention and patient safety.
- Unit 2, Systems of Measurement, reviews the metric system and introduces the apothecary system. Units encountered in pharmacy practice are discussed. Students are presented with conversions within and between measuring systems, and the application of dimensional analysis is taught. Temperature conversions and military time are covered here.
- Unit 3, Preparing for Problem Solving in Pharmacy, teaches students the basics of pharmacy abbreviations and prescription reading. The student will learn to calculate quantity to dispense, and to verify a DEA number using the “checksum” digit. Basic algebra is reviewed. The unit covers estimation and a system for converting a word problem to an algebraic equation. Ratios are defined, and the use of the ratio and proportion system of problem solving is covered.

- Unit 4, Dosing Calculations and other Pharmacy Problems, covers dosing calculations, percents and concentration calculations, compounding formulas, and IV infusion calculations. The importance of using verified patient information for calculations and estimating before calculating is re-emphasized. Business terminology is defined and applications are explained.

Text Features and Additional Resources

Each chapter begins with clear learning objectives to help clarify the study approach at the outset. As students are introduced to pharmacy terminology, words and phrases are defined in the text. Term definitions in the margins create a natural way to find and learn new terms during study. Key points are emphasized in the “Tech Note” highlighted boxes. This feature is designed to focus the reader’s attention on important teaching points. “Numbers at Work” illustrates why key concepts are important to know and skills are critical to master. Each chapter provides multiple example problems with complete explanations. Examples move students from familiar, real-life problems to pharmacy-related problems. Practice problems are found at the end of every chapter. Accurate solutions to odd numbered problems are at the end of the text. Text appendices include the parts of a prescription, a glossary of terms, and conversions and abbreviations tables.

Instructors will appreciate the additional resources found on-line through the ASHP web site. Additional practice problems will be found there, as well as a test bank.

The authors and the ASHP publication team have worked hard to create a user-friendly math textbook that is accurate and covers the breadth of possible pharmacy math problems that a pharmacy technician might face. We are interested in hearing from our users and invite your feedback. Write to: The American Society of Health-System Pharmacists, 7272 Wisconsin Avenue, Bethesda, MD 20814, attention: Special Publishing.