Dimensional Analysis for Meds: Fourth Edition
Anna M. Curren, RN, MA

Boost your confidence in dosage calculations with the strongest dimensional analysis book on the market, from leading author Anna Curren!

Dimensional Analysis for Meds, Fourth Edition, will set you on the right path to accuracy and aptitude in medication calculations. You will find full-color drug labels and life-size syringes throughout tied to questions that test your understanding and mastery of drug dosages. Upon successful completion of the program outlined in Dimensional Analysis for Meds, you will be confident in your skills as a safe and effective practitioner.

Features:
• New Chapter 7: Safe Medication Administration, highlights the newest regulations on medication abbreviations, the rights of medication administration, reducing dosage errors, and safe medication practices
• A step-by-step approach progresses from basic to complex concepts, offering concise explanations which keep you focused on need-to-know information
• Covers all the basics, including dosage labels, syringe calibrations, and metric, unit, and mEq measures
• Advanced calculations for intravenous, heparin, pediatric oral, and pediatric IV dosages are explained in a clear and thoughtful presentation
• Hundreds of examples, practice problems, and Summary Self-Test questions ensure your complete mastery of dosage calculations
• Robust back-of-book CD-ROM is your perfect interactive self-study tool, offering content tutorials, calculation problems, and self-tests
• New online WebTUTOR™ Advantage courses, in both WebCT and Blackboard formats, include questions, links, quizzes, flash cards, and more!

Also Available:
3-2-1 Calc!, Comprehensive Dosage Calculations Online
Anna M. Curren and Gloria D. Pickar

Delmar Nurse’s Drug Handbook 2010 Edition
George R. Spratto and Adrienne L. Woods
## CONTENTS

Preface / vii  
Introduction for the Learner / x  
Introduction for the Instructor / xi  
Using the Learning Package / xii  
Using the In-Book Practice Software / xiv  
Refresher Math PreTest / xvi

### 1 Refresher Math

**Chapter 1: Relative Value, Addition, and Subtraction of Decimals / 2**  
Relative Value of Decimals / 2  
Addition and Subtraction of Decimals / 7  
Summary / 8  
Summary Self-Test / 9

**Chapter 2: Multiplication and Division of Decimals / 11**  
Multiplication of Decimals / 11  
Division of Decimal Fractions / 13  
Elimination of Decimal Points / 13  
Reduction of Fractions / 14  
Reduction of Numbers Ending in Zero / 16  
Using a Calculator / 17  
Expressing to the Nearest Tenth / 17  
Expressing to the Nearest Hundredth / 18  
Summary / 19  
Summary Self-Test / 20

**Chapter 3: Solving Common Fraction Equations / 22**  
Whole-Number Equations / 22  
Decimal Fraction Equations / 25  
Multiple-Number Equations / 28  
Summary / 31  
Summary Self-Test / 31

### 2 Introduction to Drug Measures

**Chapter 4: Metric/International (SI) System / 36**  
Basic Units of the Metric/SI System / 36  
Metric/SI Prefixes / 37  
Metric/SI Abbreviations / 38  
Metric/SI Notation Rules / 39  
Conversion Between Metric/SI Units / 40  
Common Errors in Metric/SI Dosages / 43  
Summary / 44  
Summary Self-Test / 44
Contents

Chapter 5: Unit, Percentage, Milliequivalent, Ratio, Household, and Apothecary Measures / 46

International Units (units) / 46
Percentage (%) Measures / 47
Milliequivalent (mEq) Measures / 47
Ratio Measures / 48
Household and Apothecary Measures / 49
Summary / 49
Summary Self-Test / 50

Chapter 6: Oral Medication Labels and Dosage Calculation / 52

Tablet and Capsule Labels / 53
Tablet/Capsule Dosage Calculation / 57
Oral Solution Labels / 62
Measurement of Oral Solutions / 64
Summary / 66
Summary Self-Test / 66

Chapter 7: Safe Medication Administration / 75

Medication Administration Records / 75
The Six Rights of Medication Administration / 77
The Seventh Right: Partnering with the Patient / 80
Common Medication Errors / 81
Errors in Abbreviations and Drug Names / 81
Errors in Writing Metric Dosages / 81
Action Steps When Errors Occur / 82
Summary / 83
Summary Self-Test / 84

Chapter 8: Hypodermic Syringe Measurement / 85

Standard 3 mL Syringe / 85
Safety Syringes / 89
Tuberculin (TB) Syringe / 90
5 and 10 mL Syringes / 93
20 mL and Larger Syringes / 96
Summary / 97
Summary Self-Test / 98

Chapter 9: Parenteral Medication Labels and Dosage Calculation / 100

Reading Metric/SI Solution Labels / 100
Percent (%) and Ratio Solution Labels / 103
Solutions Measured in International Units / 105
Solutions Measured as Milliequivalents (mEq) / 106
Summary / 108
Summary Self-Test / 108

Chapter 10: Reconstitution of Powdered Drugs / 122

Reconstitution of a Single Strength Solution / 122
Reconstitution from Package Insert Directions / 128
Reconstitution of Multiple Strength Solutions / 129
Summary / 131
Summary Self-Test / 132

Chapter 11: Measuring Insulin Dosages / 138

Types of Insulin / 138
Insulin Label Identification / 139
Insulin Action Times / 145
Insulin Syringes / 146
Combining Insulin Dosages / 151
Insulin Injection Sites and Techniques / 152
Summary / 153
Summary Self-Test / 153
4 Dosage Calculations

Chapter 12: Dimensional Analysis/Units Conversion / 160
  Clinical Ratios / 160
  The Basic DA Equation / 161
  Equations Requiring Metric Conversions / 166
  Summary / 169
  Summary Self-Test / 170

Chapter 13: Adult and Pediatric Dosages Based on Body Weight / 188
  Converting lb to kg / 188
  Calculating Dosages from Drug Literature / 192
  Converting kg to lb / 189
  Summary / 196
  Calculating Dosages from Drug Label Information / 190
  Summary Self-Test / 197

Chapter 14: Adult and Pediatric Dosages Based on Body Surface Area / 203
  Calculating BSA from kg and cm / 203
  Assessing Orders Based on BSA / 206
  Calculating BSA from lb and in / 205
  Summary / 210
  Dosage Calculation Based on BSA / 206
  Summary Self-Test / 211

5 Dosage Calculation from Body Weight and Body Surface Area

Chapter 15: Introduction to IV Therapy / 214
  Primary Line / 214
  Secondary Line / 216
  Volume-Controlled Burettes / 219
  Indwelling Infusion Ports/Intermittent Locks / 219
  Volumetric Pumps / 221
  Syringe Pumps / 223
  Patient-Controlled Analgesia (PCA) Devices / 223
  Introduction to IV Fluids / 225
  Percentages in IV Fluids / 226
  Parenteral Nutrition / 226
  Summary / 227
  Summary Self-Test / 227

Chapter 16: IV Flow Rate Calculation / 229
  IV Tubing Calibration / 229
  Division Factor Method / 237
  Calculating gtt/min Flow Rates from mL/hr Ordered / 231
  Regulating Flow Rate / 240
  Correcting Off-Schedule Rates / 241
  Formula and Division Factor Methods of Flow Rate Calculation / 234
  Summary / 244
  Summary Self-Test / 245
Contents

Chapter 17: Calculating IV Infusion and Completion Times / 247
- Calculating Infusion Time from mL/hr Ordered / 247
- Calculating Infusion Completion Times / 249
- International/Military Time Calculations / 249
- Standard Time Calculations / 250
- Labeling Solution Bags with Infusion and Completion Times / 252
- Summary / 256
- Summary Self-Test / 256

Chapter 18: IV Medication and Titration Calculations / 262
- Calculating mL/hr Rate for Dosage Ordered / 263
- Calculating mL/hr Rate for Dosage per kg Ordered / 264
- Calculating Infusion Titrations / 270
- Summary / 272
- Summary Self-Test / 272

Chapter 19: Heparin Infusion Calculations / 276
- Heparin IV and Vial Labels / 276
- Calculating mL/hr IV Flow Rate from units/hr Ordered / 278
- Calculating units/hr Infusing from mL/hr Flow Rate / 280
- Heparin Flush Dosage / 281
- Summary / 282
- Summary Self-Test / 282

Chapter 20: Pediatric Oral and Parenteral Medications / 286
- Oral Medications / 286
- Intramuscular and Subcutaneous Medications / 288
- Summary / 289
- Summary Self-Test / 289

Chapter 21: Pediatric Intravenous Medications / 292
- Methods of IV Medication Administration / 292
- Medication Administration via Burette / 294
- Comparing IV Dosages Ordered with Average Dosages / 297
- Summary / 301
- Summary Self-Test / 301

Appendix A: Apothecary Measures / 306

Appendix B: ISMP’s List of Error-Prone Abbreviations, Symbols, and Dose Designations / 307

Index / 311

Not For Sale
Dimensional Analysis for Meds, fourth edition, is your best partner for success in the dosage calculations arena. With a growing record of positive instruction with hundreds of thousands of users, its fully self-instructional approach fosters achievement and confidence as the ideal choice for both learners and instructors.

A large part of the credit for this successful journey lies in the fact that Dimensional Analysis for Meds, fourth edition, has kept up with the times, while never losing sight of the beginning students it was designed to teach. Dimensional Analysis for Meds is the only calculations text of its kind that is completely focused to teach from simple to complex. It eliminates the unnecessary, keeps instruction consistently geared toward clinical realities, and offers a solid and seamless learning process from day one until program completion.

ORGANIZATION

Dimensional Analysis for Meds allows for self-paced study, progressing from basic to more complex information. All learners are invited to complete the Refresher Math Pretest on page xvi to determine their competence in basic math skills. Section 1, Refresher Math, is also recommended for all learners, as the numerous shortcuts and memory cues included in this section are used in examples throughout the text. Calculators are used routinely in clinical facilities and on the NCLEX exam, and their use is encouraged in this text. Bear in mind that fractional variations in answers due to rounding of numbers may occur and should be considered correct.

Once the fundamental skills are mastered, the learner will move on to the basics needed for calculating dosages and administering medications; metric system units and milliequivalent dosages; reading dosage labels and syringe calibrations; and working with reconstituted drugs and insulin. Hundreds of sample dosage problems will cement these learnings.

With these basic skills solidified, students are prepared for the advanced calculations presented in the second half of the text. Body weight and body surface area dosage calculations, as well as intravenous and heparin calculations, are thoroughly covered and tested. Pediatric medication calculations round out the learner’s education.

FEATURES

Dimensional Analysis for Meds, fourth edition, offers examples and review tests throughout to enhance comprehension, and running answers allow the learner to receive immediate feedback on deficits and strengths. A key icon is used throughout the chapters to allow learners to easily identify important information. The most up-to-date equipment and safety devices are depicted in color, and real, full-color drug labels and syringes are included with explanations and dosage problems. With the goal of helping students become safe and effective practitioners, Dimensional Analysis for Meds works through basic and advanced calculations in detail, including intravenous and pediatric calculations, so that students are fully equipped to safely prepare and administer medications in a clinical setting.
NEW TO THIS EDITION

- All new syringe photos with enhanced readability and clarity make the medication administration experience mirror reality.
- Many new, current drug labels reflect the most up-to-date information on the market.
- New Chapter 7: Safe Medication Administration highlights the newest regulations on medication abbreviations, the six rights of medication administration, tips on reducing dosage errors, and guidelines for safe medication practices.
- An exciting in-book CD with tutorials, problems, and self-tests allows study and testing in an interactive environment.
- New online WebTutor Advantage courses (WebCT and Blackboard) include questions, links, quizzes, flash cards, and other valuable resources, all designed to enhance classroom learning.
- A new Instructor Resources (IR) CD-ROM with teaching aids and calculation solutions is now offered to instructors who adopt the text.

ANCILLARY SUPPORT MATERIALS

This fourth edition of Dimensional Analysis for Meds offers a wealth of electronic resources to support both students and instructors. These interactive learning partners will guide, test, challenge, and help increase proficiency in dosage calculations.

Tutorial Software

Engaging Student Practice Software is available free to each user of Dimensional Analysis for Meds, fourth edition. The CD-ROM packaged within the book features:

- A user-friendly menu structure invites immediate access to the program's items.
- Five modules of content, each containing three to six lessons, are supported by problem sets to test understanding.
- Audio and visual tracks enhance interactive exercises that allow calculation and measurement of dosages.
- A drop-down calculator, as used on the NCLEX-RN® examination, is available at the click of a button.

Instructor Resources (IR) CD-ROM (ISBN 1-4354-3868-X)

An innovative new Instructor Resources CD-ROM offers a wealth of useful tools to facilitate teaching and support of goals for student success. The following components are included in this invaluable digital resource, which is free to adopters of Dimensional Analysis for Meds, fourth edition:

- Lecture slides, created in Power Point®, facilitate classroom instruction by offering ready-made presentation outlines, tools, and procedures.
- A Computerized Test Bank offers several hundred new questions designed for testing and evaluation.
An Instructor’s Manual offers review questions with solutions, additional practice problems with solutions, drug label exercises, syringe exercises, and teaching tips.

A Solutions Manual includes step-by-step solutions to all problems and self-tests included in the text.

An Image Library of dozens of figures, labels, and syringes from the text facilitates searching for, copying, and saving images into Microsoft PowerPoint® presentations or other learning tools.

**WebTutor Advantage on WebCT (ISBN 1-4354-3869-8) and Blackboard (ISBN 1-4354-3870-1)**

WebTutors (both WebCT and Blackboard formats) accompany this new edition of *Dimensional Analysis for Meds*. These online resources offer must-have classroom management tools, such as chats and calendars, as well as additional content resources, including class notes, videos, student quizzes, frequently asked questions, an audio glossary, and more.

**Online Companion**

An exciting, new, robust online companion is available to adopters of this textbook. This valuable resource includes instructor support materials, exercises, and more. To access the site, simply point your browser to http://www.delmar.cengage.com/companions. Select the nursing discipline.
Welcome to what we anticipate will be one of the more enjoyable texts in your bookbag. *Dimensional Analysis for Meds*, fourth edition, is about to reassure you that math is nothing to be afraid of, and that on completion of your instruction you will have the calculation skills you need to practice safely in your profession. You don’t have to be a math expert to be successful in dosage calculations; what you do need is a desire for accuracy and a motivation to learn. If you have not used your math skills for a number of years, Section 1, Refresher Math, will quickly bring you up to date. *Dimensional Analysis for Meds* is fully self-instructional and lets you move at your own pace through the content. Hundreds of examples and problems will keep your learning on track. Here are some tips to help you get started.

1. Gather a calculator, pencil or pen, and plenty of scratch paper.

2. Start by completing the Refresher Math Pretest on page xvi. This will alert you to those areas in Section 1, Refresher Math, that will need your particular attention. Some of the items in the Pretest and Refresher Math section were designed to be completed without using a calculator, but the choice is entirely yours; when you need a calculator, use one. You must remember, however, that calculator settings vary. All answers in this text were checked with a calculator set to hundredths. If you use one with a different setting, you may experience small differences in your answers in the tenths or hundredths.

3. Record the answers to calculations on the scratch paper as well as in your text. This makes checking your answers against those we provide much easier.

4. As you work your way through the chapters, do exactly as you are instructed to do. Programmed learning proceeds in small steps, and jumping ahead may cause confusion. All chapters are designed to let you move at your own speed, and if you already know some of the basics, you will move through them more quickly than you can imagine.

5. Once you have completed your instruction, keep *Dimensional Analysis for Meds* in your personal library. As you move to different clinical areas during your career, you will encounter different types of calculations. A quick refresher with *Dimensional Analysis for Meds* will be invaluable when that occurs.
Welcome to the fourth edition of *Dimensional Analysis for Meds*. Whether you are a seasoned user of this text or are becoming acquainted with it for the first time, we would like to share a few ideas on how to most effectively incorporate this bestselling text into your curriculum. *Dimensional Analysis for Meds* is designed to be used starting early in the students’ beginning semester. Many instructors assign the entire Section 1, Refresher Math, to be completed before the semester starts, and test on it within the first two weeks. Or, chapters can be assigned on a weekly basis at a pace fitting your students’ profiles.

Students have many pressures on their time, and experience has shown that they learn best when their progress is routinely both encouraged and monitored. A short weekly test of about ten questions on the content assigned is the ideal way to do this. If a student struggles with the first test, provide a makeup opportunity. If a second test is unsuccessful, you will need to delve more deeply to determine the exact problem and help the student establish a study plan. The content in Section 1 is ideally suited to bring students up to the level of math skills required for success in dosage calculations.

Because testing and reinforcement are such vital components of learner success, encourage learners to use the CD-ROM located in the back of the textbook. Each module in this valuable electronic resource opens with a short tutorial designed to reinforce text concepts. Interactive problems and self-tests for each module reinforce accuracy and offer feedback as the student works at an individual pace. Another valuable electronic resource for learners is the WebCT and Blackboard courses accompanying *Dimensional Analysis for Meds*; these include class notes, frequently asked questions, additional quizzes, and much more, all of which offer excellent reinforcement of concepts presented in the text.

As an instructor, you will also have access to valuable electronic resources that will enhance your students’ success. Lecture slides created in PowerPoint®, calculation solutions, images, instructor strategies, and a test bank are all included on our *Instructor Resources CD-ROM*, with the goal of facilitating classroom preparation and allowing you to focus as much time as possible on student interaction and competence. With *Dimensional Analysis for Meds*, both you and your students are prepared for success!
USING THE LEARNING PACKAGE

A Key icon designates important reminders to help with calculations and to highlight important safety considerations. As you study for your exams, locate these Keys and make sure you know and understand them. Consider making flash cards of the Keys to be certain you know them.

Example icons walk you through each concept in a step-by-step manner, showing the calculation and mathematical processes. Focus on these areas to be sure you understand how to do each different type of calculation.

Problems are sprinkled throughout each chapter. This is your opportunity to put your skills to the test, to identify your areas of strength, and to also acknowledge those areas where you need additional study. Answers to all problems are printed in the accompanying shaded box. Double-check your calculations if you have difficulty, or talk to your instructor for additional help.

Actual full-color labels are used to support the problems and examples. Challenge yourself to read the labels carefully and accurately; are you able to understand the quantity, strength, form, dosing, and administration guidelines for every label you encounter?
New photos of syringes are depicted in actual size so that you can gain confidence in perfecting the real-life skill of accurately reading and interpreting syringe calibrations and medication levels.

Summary Self-Tests round out each chapter. Complete these as you finish studying the material, identify areas where you need to focus, and review the content again until you are confident in your calculating ability. Many of these tests include combined label and syringe questions, where you must calculate a dosage and then measure the dosage on a syringe. This is an excellent tool to test how well you apply your knowledge.

Online Resources are available at your fingertips. Visit the online companion and web tutor components for valuable course content, exercises, tutorials, class notes, glossaries, and more.
We are pleased to present the fourth edition of the Dimensional Analysis for Meds Learning Program CD-ROM. The CD-ROM is a proven tool for reinforcing important instructional content in your text in a unique and interactive way, using audio and visual presentation and animations. You will enjoy the following features:

Main Menu
The Learning Program presents five modules of content, each of which contains three to six lessons. The modules are:

- Refresher Math
- Introduction to Dimensional Analysis
- Calculating IV Flow Rate
- Calculating IV Infusion Time
- Calculating Dosage Infusing During Titration

Problems
Each didactic presentation is followed by a series of problems. Audio and visuals are used together to explain each step of solving the problem.
Subtitles
The audio presentation clearly describes each step in solving problems using the dimensional analysis approach. You can listen to the narration or read it in subtitles at the bottom of the screen. Simply click a button to turn subtitles on or off.

Summary Self-Tests
Each module includes a brief test of all of the concepts presented. You have the option to print the test and complete it on the hard copy, or take the test on the screen. You can also view the answers on a separate screen to check your work.
REFRESHER MATH PRETEST

If you can complete the Pretest with 100% accuracy, you are off to an exceptional start. However, don’t be alarmed if you make some errors because the Refresher Math section that follows is designed to bring your math skills up-to-date. Regardless of your proficiency, it’s important that you complete the entire Refresher Math Section. It includes memory cues and shortcuts for simplifying and solving many of the clinical calculations that are included in the entire text, and you will need to be familiar with these.

Identify the decimal fraction with the greatest value in each set.
1. a) 4.4  b) 2.85  c) 5.3
2. a) 6.3  b) 5.73  c) 4.4
3. a) 0.18  b) 0.62  c) 0.35
4. a) 0.2  b) 0.125  c) 0.3
5. a) 0.15  b) 0.125  c) 0.3
6. a) 4.27  b) 4.31  c) 4.09

Add these decimals.
7. 0.2 + 2.23 =
8. 1.5 + 0.07 =
9. 6.45 + 12.1 + 9.54 =
10. 0.35 + 8.37 + 5.15 =

Subtract these decimals.
11. 3.1 − 0.67 =
12. 12.41 − 2.11 =
13. 2.235 − 0.094 =
14. 4.65 − 0.7 =
15. If tablets with a strength of 0.2 mg are available and 0.6 mg is ordered, how many tablets must you give?
16. If tablets are labeled 0.8 mg and 0.4 mg is ordered, how many tablets must you give?
17. If the available tablets have a strength of 1.25 mg and 2.5 mg is ordered, how many tablets must you give?
18. If 0.125 mg is ordered and the tablets available are labeled 0.25 mg, how many tablets must you give?

Express these to the nearest tenth.
19. 2.17 =
20. 0.15 =
21. 3.77 =
22. 4.62 =
23. 11.74 =
24. 5.26 =

Express these to the nearest hundredth.
25. 1.357 =
26. 7.413 =
27. 10.105 =
28. 3.775 =
29. 0.176 =
30. Define “product.”

Multiply these decimals. Express your answers to the nearest tenth.
31. 0.7 × 1.2 =
32. 1.8 × 2.6 =
33. 5.1 × 0.25 × 1.1 =
34. 3.3 × 3.75 =

Divide these fractions. Express your answers to the nearest hundredth.
35. 16.3 ÷ 3.2 =
36. 15.1 ÷ 1.1 =
37. 2 ÷ 0.75 =
38. 4.17 ÷ 2.7 =
39. Define “numerator.”
40. Define “denominator.”
41. Define “greatest common denominator.”

Solve these equations. Express your answers to the nearest tenth.
42. \( \frac{1}{4} \times \frac{2}{3} = \)
43. \( \frac{240}{170} \times 135 \frac{300}{2} = \)
44. \( \frac{0.2}{1.75} \times 1.5 \frac{0.2}{1} = \)
45. \( \frac{2.1}{3.6} \times 1.7 \frac{1.3}{1} = \)
46. \( \frac{0.26}{0.2} \times 3.3 \frac{1.2}{1} = \)
47. \( \frac{750}{1} \times 300 \times 7 \frac{2}{2} = \)
48. \( \frac{50}{1} \times 60 \times \frac{1}{240} \times 400 \frac{1}{1} = \)
49. \( \frac{35,000}{750} \times 35 \frac{1}{1} = \)
50. \( \frac{50}{40} \times 450 \times \frac{1}{900} \times 114 \frac{1}{1} = \)

Answers
1. c
2. a
3. b
4. c
5. a
6. b
7. 2.43
8. 1.57
9. 28.09
10. 13.87
11. 2.43
12. 10.3
13. 2.141
14. 3.95
15. 3 tab
16. ½ tab
17. 2 tab
18. ½ tab
19. 2.2
20. 0.2
21. 3.8
22. 4.6
23. 11.7
24. 5.3
25. 1.36
26. 7.41
27. 10.11
28. 3.78
29. 0.18
30. The answer obtained from the multiplication of two or more numbers
31. 0.8
32. 4.7
33. 1.4
34. 12.4
35. 5.09
36. 13.73
37. 2.67
38. 1.54
39. The top number in a common fraction
40. The bottom number in a common fraction
41. The greatest number that can be divided into two numbers to reduce them to their lowest terms (values)
CHAPTER 1
Relative Value, Addition, and
Subtraction of Decimals / 2

CHAPTER 2
Multiplication and Division of
Decimals / 11

CHAPTER 3
Solving Common Fraction
Equations / 22
In the course of administering medications, you will be dealing with decimal fraction dosages on a daily basis. The first two chapters of this text provide a complete refresher on everything you need to know about decimals, including safety measures when you do calculations both manually and with a calculator. We’ll start with a review of the range of decimal values you will see in dosages. This will enable you to recognize which of two or more numbers has the greater (or lesser) value—a skill you will use constantly in your professional career.

RELATIVE VALUE OF DECIMALS

The most helpful fact to remember about decimals is that our monetary system of dollars and cents is a decimal system. The whole numbers in dosages have the same relative value as dollars, and decimal fractions have the same value as cents: the greater the number, the greater the value. If you keep this in mind, you will have already learned the most important safety measure of dealing with decimals in dosages.

The range of drug dosages, which includes decimal fractions, stretches from millions on the whole number side, to thousandths on the decimal side. Refer to the decimal scale in Figure 1-1, and locate the decimal point, which
is slightly to the right on this scale. Notice the whole numbers on the left of the scale, which rise increasingly in value from ones (units) to millions, which is the largest whole-number drug dosage in current use.

The first determiner of the relative value of decimals is the presence of whole numbers. The greater the whole number, the greater the value.

**EXAMPLE 1** 10.1 is greater than 9.15
**EXAMPLE 2** 3.2 is greater than 2.99
**EXAMPLE 3** 7.01 is greater than 6.99

**Problems 1.1**

Choose the greatest value in each set.

1. a) 3.5  
   b) 2.7  
   c) 4.2
2. a) 6.15  
   b) 5.95  
   c) 4.54
3. a) 12.02  
   b) 10.19  
   c) 11.04
4. a) 2.5  
   b) 1.75  
   c) 0.75
5. a) 4.3  
   b) 2.75  
   c) 5.1
6. a) 6.15  
   b) 7.4  
   c) 5.95
7. a) 7.25  
   b) 8.1  
   c) 9.37
8. a) 4.25  
   b) 5.1  
   c) 3.75
9. a) 9.4  
   b) 8.75  
   c) 7.4
10. a) 5.1  
   b) 6.33  
   c) 4.2

**Answers** 1. c  
2. a  
3. a  
4. a  
5. c  
6. b  
7. c  
8. b  
9. a  
10. b

If, however, the whole numbers are the same—for example, 10.2 and 10.7—or there are no whole numbers—for example, 0.25 and 0.35—then the fraction will determine the relative value. Let’s take a closer look at the fractional side of the scale (refer to Figure 1-2).
It is necessary to consider only three figures after the decimal point on the fractional side, because drug dosages measured as decimal fractions do not contain more than three digits; for example, 0.125 mg. Notice that a zero is used to replace the whole number in this decimal fraction and in all dosages that do not contain a whole number.

If a decimal fraction is not preceded by a whole number, a zero is used in front of the decimal point to emphasize that the number is a fraction.

**EXAMPLE**

0.125  0.1  0.45

Look again at Figure 1-2. The numbers to the right of the decimal point represent tenths, hundredths, and thousandths, in that order. When you see a decimal fraction in which the whole numbers are the same, or there are no whole numbers, stop and look first at the number representing tenths.

The fraction with the greater number representing tenths has the greater value.

**EXAMPLE 1**

0.3 is greater than 0.27

**EXAMPLE 2**

0.4 is greater than 0.29

**EXAMPLE 3**

1.2 is greater than 1.19

**EXAMPLE 4**

3.5 is greater than 3.2

**Problems 1.2**

Choose the greatest value in each set.

1. a) 0.4  b) 0.2  c) 0.5  ___________
2. a) 2.73  b) 2.61  c) 2.87  ___________
3. a) 0.19  b) 0.61  c) 0.34  ___________
4. a) 3.5  b) 3.75  c) 3.25  ___________
5. a) 0.3  b) 0.25  c) 0.4  ___________
6. a) 1.35  b) 1.29  c) 1.4  ___________
7. a) 2.5  b) 2.7  c) 2.35  ___________
8. a) 4.51  b) 4.75  c) 4.8  ___________
9. a) 0.8  b) 0.3  c) 0.4  ___________
10. a) 2.1  b) 2.05  c) 2.15  ___________

**Answers**  1. c  2. c  3. b  4. b  5. c  6. c  7. b  8. c  9. a  10. c
If in decimal fractions the numbers representing the tenths are identical—for example, 0.25 and 0.27—then the number representing the hundredths will determine the relative value.

**When the tenths are identical, the fraction with the greater number representing hundredths will have the greater value.**

**EXAMPLE 1** 0.27 is greater than 0.25

**EXAMPLE 2** 0.15 is greater than 0.1 (0.1 is the same as 0.10)

Extra zeros on the end of decimal fractions are omitted in drug dosages because they can easily be misread and lead to errors.

**EXAMPLE 3** 2.25 is greater than 2.2 (same as 2.20)

**EXAMPLE 4** 9.77 is greater than 9.7 (same as 9.70)

**Problems 1.3**

Choose the greatest value in each set.

1. a) 0.12  b) 0.15  c) 0.17  
2. a) 1.2  b) 1.24  c) 1.23  
3. a) 0.37  b) 0.3  c) 0.36  
4. a) 3.27  b) 3.25  c) 3.21  
5. a) 0.16  b) 0.11  c) 0.19  
6. a) 4.23  b) 4.2  c) 4.09  
7. a) 3.27  b) 3.21  c) 3.29  
8. a) 2.75  b) 2.73  c) 2.78  
9. a) 0.31  b) 0.37  c) 0.33  
10. a) 0.43  b) 0.45  c) 0.44

**Answers** 1. c  2. b  3. a  4. a  5. c  6. a  7. c  8. c  9. b  10. b

**Problems 1.4**

Which fraction has the greater value?

a) 0.125  b) 0.25
Section 1 Refresher Math

**Answer** If you chose 0.125, you have just made a serious drug dosage error. Look again at the numbers representing the tenths, and you will see that 0.25 is greater than 0.125. Remember that extra zeros are omitted in decimal fraction dosages because they can lead to errors. In this fraction, 0.25 is the same as 0.250, which is exactly double the value of 0.125. **Check the tenths carefully, regardless of the total of numbers after the decimal point.**

**EXAMPLE 1** 0.15 (same as 0.150) is greater than 0.125

**EXAMPLE 2** 0.3 (same as 0.30) is greater than 0.15

**EXAMPLE 3** 0.75 (same as 0.750) is greater than 0.325

**EXAMPLE 4** 0.8 (same as 0.80) is greater than 0.16

The number of figures on the right of the decimal point is not an indication of relative value. Always look at the figure representing the tenths first, and if these are identical, check the hundredths to determine which has the greater value.

This completes your introduction to the relative value of decimals. The key points just reviewed will cover all situations in dosage calculations in which you will have to recognize greater and lesser values. Test yourself more extensively on this information in the following problems.

### Problems 1.5

Choose the greatest value in each set.

1. a) 0.24  b) 0.5  c) 0.125
2. a) 0.4  b) 0.45  c) 0.5
3. a) 7.5  b) 6.25  c) 4.75
4. a) 0.3  b) 0.25  c) 0.35
5. a) 1.125  b) 1.75  c) 1.5
6. a) 4.5  b) 4.75  c) 4.25
7. a) 0.1  b) 0.01  c) 0.04
8. a) 5.75  b) 6.25  c) 6.5
9. a) 0.6  b) 0.16  c) 0.06
10. a) 3.55  b) 2.95  c) 3.7

**Answers** 1. b  2. c  3. a  4. c  5. b  6. b  7. a  8. c  9. a  10. c
ADDITION AND SUBTRACTION OF DECIMALS

Complex addition and subtraction of decimals should be done with a calculator, but, on occasion, time can be saved by doing simple calculations without one. Let's start by looking at a few key points that will make manual solution safer.

When you write down the numbers, line up the decimal points.

EXAMPLE To add 0.25 and 0.27

0.25
+0.27

0.52

Adding 0.27 is safe; +0.27 is unsafe; it could lead to errors.

Always add or subtract from right to left.

If you decide to write down the numbers, do not confuse yourself by trying to "eyeball" the answer. Also, write any numbers carried or rewrite those reduced by borrowing if you find this helpful.

EXAMPLE 1 When adding 0.25 and 0.27

1
0.25
+0.27

0.52

Add the 5 and 7 first, then the 2, 2, and the 1 you carried; work from right to left.

EXAMPLE 2 When subtracting 0.63 from 0.71

61
0.71
−0.63
0.08

Borrow 1 from 7 and rewrite as 6
Write the borrowed 1; subtract 3 from 11
Subtract 6 from 6; work from right to left

Add zeros as necessary to make the fractions of equal length.

Adding zeros to make the fractions of equal length does not alter the value of the fractions, and it helps prevent confusion and mistakes.

EXAMPLE When subtracting 0.125 from 0.25

0.25
0.125 becomes 0.250
0.125

Answer = 0.125

If you follow these simple rules and make them a habit, you will automatically reduce calculation errors. The problems on the following page will give you an excellent opportunity to practice addition and subtraction.
Problems 1.6

Add decimals.
1. \(0.25 + 0.55 = \) __________
2. \(0.1 + 2.25 = \) __________
3. \(1.74 + 0.76 = \) __________
4. \(1.4 + 0.02 = \) __________
5. \(2.3 + 1.45 = \) __________
6. \(3.75 + 1.05 = \) __________
7. \(6.35 + 2.05 = \) __________
8. \(5.57 + 4.03 = \) __________
9. \(0.33 + 2.42 = \) __________
10. \(1.44 + 3.06 = \) __________

Subtract decimals.
11. \(1.25 - 1.125 = \) __________
12. \(3.25 - 0.65 = \) __________
13. \(2.3 - 1.45 = \) __________
14. \(0.02 - 0.01 = \) __________
15. \(5.5 - 2.5 = \) __________
16. \(7.33 - 4.03 = \) __________
17. \(4.25 - 1.75 = \) __________
18. \(0.07 - 0.035 = \) __________
19. \(0.235 - 0.12 = \) __________
20. \(5.75 - 0.95 = \) __________

Answers 1. 0.8 2. 2.35 3. 2.5 4. 1.42 5. 3.75 6. 4.8 7. 8.4 8. 9.6 9. 2.75 10. 4.5
11. 0.125 12. 2.6 13. 0.85 14. 0.01 15. 3 16. 3.3 17. 2.5 18. 0.035 19. 0.115 20. 4.8

Note: If you did not add a zero before the decimal point in answers that do not contain a whole number, or failed to eliminate unnecessary zeros from the end of decimal fractions, your answers are incorrect.

Summary

This concludes the refresher on relative value, addition, and subtraction of simple decimal fractions. The important points to remember from this chapter are:

- If a decimal fraction contains a whole number, the value of the whole number is the first determiner of relative value.
- If a fraction does not include a whole number, a zero is placed in front of the decimal point to emphasize that it is a fractional dosage.
- If there is no whole number, or if the whole numbers are the same, the number representing the tenths in the decimal fraction will be the next determiner of relative value.
- If the tenths in decimal fractions are identical, the number representing hundredths will determine relative value.
- When manually adding or subtracting decimal fractions, first line up the decimal points, then add or subtract from right to left.
- Extra zeros on the end of decimal fractions can be a source of error in drug dosages, and are routinely eliminated.
**Summary Self-Test**

Choose the decimal with the greatest value.

1. a) 2.45  
   b) 2.57  
   c) 2.19

2. a) 3.07  
   b) 3.17  
   c) 3.71

3. a) 0.12  
   b) 0.02  
   c) 0.01

4. a) 5.31  
   b) 5.35  
   c) 6.01

5. a) 4.5  
   b) 4.51  
   c) 4.15

6. a) 0.015  
   b) 0.15  
   c) 0.1

7. a) 1.3  
   b) 1.25  
   c) 1.35

8. a) 0.1  
   b) 0.2  
   c) 0.25

9. a) 0.125  
   b) 0.1  
   c) 0.05

10. a) 13.7  
    b) 13.5  
    c) 13.25

11. If you have medication tablets whose strength is 0.1 mg and you must give 0.3 mg, you will need
   a) 1 tablet.  
   b) less than 1 tablet.  
   c) more than 1 tablet.

12. If you have tablets with a strength of 0.25 mg and you must give 0.125 mg, you will need
   a) 1 tablet.  
   b) less than 1 tablet.  
   c) more than 1 tablet.

13. If you have an order to give a dosage of 7.5 mg and the tablets have a strength of 3.75 mg, you will need
   a) 1 tablet.  
   b) less than 1 tablet.  
   c) more than 1 tablet.

14. If the order is to give 0.5 mg and the tablet strength is 0.5 mg, you will give
   a) 1 tablet.  
   b) less than 1 tablet.  
   c) more than 1 tablet.

15. The order is to give 0.5 mg and the tablets have a strength of 0.25 mg. You must give
   a) 1 tablet.  
   b) less than 1 tablet.  
   c) more than 1 tablet.

Add the decimals manually.

16. 1.31 + 0.4  =  
    17. 0.15 + 0.25  =  
    18. 2.5 + 0.75  =  
    19. 3.2 + 2.17  =  
    20. 1.3 + 1.04  =  
    21. 4.7 + 3.03  =  
    22. 0.5 + 0.5  =  
    23. 5.4 + 2.6  =  

24. You have just given two tablets with a dosage strength of 3.5 mg each. What was the total dosage administered?  

25. You are to give your patient one tablet labeled 0.5 mg and one labeled 0.25 mg. What is the total dosage of these two tablets?  

26. If you give two tablets labeled 0.02 mg, what total dosage will you administer?
27. You are to give one tablet labeled 0.8 mg and two tablets labeled 0.4 mg. What is the total dosage? __________

28. You have two tablets: one is labeled 0.15 mg and the other 0.3 mg. What is the total dosage of these two tablets? __________

**Subtract the decimals manually.**

29. $4.32 - 3.1 = \underline{\hspace{2cm}}$ \hspace{2cm} 33. $1.3 - 0.02 = \underline{\hspace{2cm}}$

30. $2.1 - 1.91 = \underline{\hspace{2cm}}$ \hspace{2cm} 34. $0.2 - 0.07 = \underline{\hspace{2cm}}$

31. $3.73 - 1.93 = \underline{\hspace{2cm}}$ \hspace{2cm} 35. $3.95 - 0.35 = \underline{\hspace{2cm}}$

32. $5.75 - 4.05 = \underline{\hspace{2cm}}$ \hspace{2cm} 36. $1.9 - 0.08 = \underline{\hspace{2cm}}$

37. Your patient is to receive a dosage of 7.5 mg and you have only one tablet labeled 3.75 mg. How many more milligrams must you give? __________

38. You have a tablet labeled 0.02 mg and your patient is to receive 0.06 mg. How many more milligrams must you give? __________

39. The tablet available is labeled 0.5 mg, but you must give a dosage of 1.5 mg. How many more milligrams will you need to obtain the correct dosage? __________

40. Your patient is to receive a dosage of 1.2 mg and you have one tablet labeled 0.6 mg. What additional dosage in milligrams will you need? __________

41. You must give your patient a dosage of 2.2 mg, but you have only two tablets labeled 0.55 mg. What additional dosage in milligrams will you need? __________

**Determine how many tablets will be needed to give the dosages.**

42. Tablets are labeled 0.01 mg. You must give 0.02 mg. __________

43. Tablets are labeled 2.5 mg. You must give 5 mg. __________

44. Tablets are labeled 0.25 mg. Give 0.125 mg. __________

45. Tablets are 0.5 mg. Give 1.5 mg. __________

46. A dosage of 1.8 mg is ordered. Tablets are 0.6 mg. __________

47. Tablets available are 0.04 mg. You are to give 0.02 mg. __________

48. The dosage ordered is 3.5 mg. The tablets available are 1.75 mg. __________

49. Prepare a dosage of 3.2 mg using tablets with a strength of 1.6 mg. __________

50. You have tablets labeled 0.25 mg and a dosage of 0.375 mg is ordered. __________

**Answers**

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**Note:** If you did not add a zero before the decimal point in answers that did not contain a whole number, or failed to eliminate unnecessary zeros from the end of decimal fractions, your answers are incorrect.
MULTIPLICATION AND DIVISION OF DECIMALS

Multiplication and division are integral parts of dosage calculations. As is the case with addition and subtraction, some multiplication and division problems involving dosages can be done manually, so the basic steps in multiplication and division are reviewed in this chapter. In addition, a number of shortcuts will be introduced that can make numbers easier to work with, especially those containing decimal fractions. And for those calculations that are more safely handled with a calculator, safety in calculator use will be discussed.

MULTIPLICATION OF DECIMALS

The main precaution in multiplication of decimals is the placement of the decimal point in the answer, which is called the product.

The decimal point in the product of decimal fractions is placed the same number of places to the left in the product as the total of numbers following the decimal points in the fractions multiplied.

EXAMPLE 1
Multiply 0.35 by 0.5
It is safer to begin by lining up the numbers to be multiplied on the right side. Then, disregard the decimals during multiplication.

\[
\begin{array}{c}
0.35 \\
\times 0.5 \\
\hline
175
\end{array}
\]

The product/answer is 175; 0.35 has two numbers after the decimal and 0.5 has one. Place the decimal point three places to the left in the product to make it .175, then add a zero (0) in front of the decimal to emphasize the fraction.

Answer = 0.175
EXAMPLE 2

Multiply 1.61 by 0.2

\[
\begin{array}{c}
1.61 \\
\times 0.2 \\
\hline
3.22
\end{array}
\]

Line up the numbers on the right

The product is 322; 1.61 has two numbers after the decimal point and 0.2 has one. Place the decimal point three places to the left in the product so that 322 becomes .322, then add a zero in front of the decimal to emphasize the fraction.

Answer = 0.322

If the product contains insufficient numbers for correct placement of the decimal point, add as many zeros as necessary to the left of the product to correct this.

EXAMPLE 3

Multiply 1.5 by 0.06

\[
\begin{array}{c}
1.5 \\
\times 0.06 \\
\hline
9.0
\end{array}
\]

Line up the numbers on the right

The product is 90; 1.5 has one number after the decimal point and 0.06 has two. To place the decimal three places to the left in the product, a zero must be added, making it .090. Eliminate the excess zero from the end of the fraction, and add a zero in front of the decimal point.

Answer = 0.09

EXAMPLE 4

Multiply 0.21 by 0.32

\[
\begin{array}{c}
0.21 \\
\times 0.32 \\
\hline
42 \\
63 \\
672
\end{array}
\]

Indent second number multiplication
Add the totals

In this example, 0.21 has two numbers after the decimal point and 0.32 also has two. Add a zero in front of 672 to allow correct placement of the decimal point, making it .0672, then add a zero in front of the fraction to emphasize it.

Answer = 0.0672

EXAMPLE 5

Multiply 0.12 by 0.2

\[
\begin{array}{c}
0.12 \\
\times 0.2 \\
\hline
24
\end{array}
\]

In this example, there are a total of three numbers after the decimal points in 0.12 and 0.2. Add a zero in front of 24 for correct decimal placement, making it .024, then add a zero in front of .024 to emphasize the fraction.

Answer = 0.024
Multiply the decimal fractions without using a calculator.

1. \(0.45 \times 0.2 = \) 
2. \(0.35 \times 0.12 = \) 
3. \(1.3 \times 0.05 = \) 
4. \(0.7 \times 0.04 = \) 
5. \(0.4 \times 0.17 = \) 
6. \(2.14 \times 0.03 = \) 
7. \(1.4 \times 0.4 = \) 
8. \(3.3 \times 1.2 = \) 
9. \(2.7 \times 2.2 = \) 
10. \(2.1 \times 0.3 = \)

Answers: 1. 0.09 2. 0.042 3. 0.065 4. 0.028 5. 0.068 6. 0.0642 7. 0.56 8. 3.96 9. 5.94 10. 0.63

DIVISION OF DECIMAL FRACTIONS

A calculator may also be used for division of complex decimal fractions. However, let's start by reviewing the terminology of common fraction division, and three important pre-calculator steps that may make final manual division easier: elimination of decimal points, reduction of the fractions, and reduction of numbers ending in zero. The following is a sample of a common fraction division seen in dosages.

**EXAMPLE 1**

\[ \frac{0.25}{0.125} = \frac{\text{numerator}}{\text{denominator}} \]

You'll recall that the top number in a common fraction is called the numerator, whereas the bottom number is called the denominator. If you have trouble remembering which is which, think of D, for down, for denominator. The denominator is on the bottom. With this basic terminology reviewed, we are now ready to look at preliminary math steps that can be used to simplify a fraction or actually solve an equation and eliminate the need for calculator division.

ELIMINATION OF DECIMAL POINTS

Decimal points can be eliminated from numbers in a decimal fraction without changing its value, if they are moved the same number of places in one numerator and one denominator.

To eliminate the decimal points from decimal fractions, move them the same number of places to the right in a numerator and a denominator until they are eliminated from both. Zeros may have to be added to accomplish this.

**EXAMPLE 1**

\[ \frac{0.25}{0.125} \text{ becomes } \frac{250}{125} \]

The decimal point must be moved three places to the right in the denominator 0.125 to make it 125. Therefore, it must be moved three places to the right in the numerator 0.25, which requires the addition of one zero to make it 250.
**EXAMPLE 2**  
\[
\frac{0.3}{0.15} \text{ becomes } \frac{30}{15}
\]

The decimal point must be moved two places in 0.15 to make it 15, so it must be moved two places in 0.3, which requires the addition of one zero to become 30.

**EXAMPLE 3**  
\[
\frac{1.5}{2} \text{ becomes } \frac{15}{20}
\]

Move the decimal point one place in 1.5 to make it 15; add one zero to 2 to make it 20.

**EXAMPLE 4**  
\[
\frac{4.5}{0.95} \text{ becomes } \frac{450}{95}
\]

Eliminating the decimal points from a decimal fraction before final division does not alter the value of the fraction, or the answer obtained in the final division.

**Problems 2.2**

Eliminate the decimal points from these common fractions.

1. \[
\frac{17.5}{2} = \quad \frac{0.1}{0.05} = \quad \frac{10}{5} = \quad \frac{0.4}{0.04} = \quad \frac{12}{4}
\]

2. \[
\frac{0.5}{25} = \quad \frac{0.9}{0.03} = \quad \frac{10.75}{2.5} = \quad \frac{0.4}{0.04} = \quad \frac{12}{4}
\]

3. \[
\frac{6.3}{0.6} = \quad \frac{10.75}{2.5} = \quad \frac{0.4}{0.04} = \quad \frac{12}{4}
\]

4. \[
\frac{3.76}{0.4} = \quad \frac{10.75}{2.5} = \quad \frac{0.4}{0.04} = \quad \frac{12}{4}
\]

5. \[
\frac{8.4}{0.7} = \quad \frac{10.75}{2.5} = \quad \frac{0.4}{0.04} = \quad \frac{12}{4}
\]

**REDUCTION OF FRACTIONS**

Once the decimal points are eliminated, a second simplification step is to reduce the numbers as far as possible using common denominators/divisors, the largest number that will divide both a numerator and a denominator.

To further reduce fractions, divide numbers by their greatest common denominator (the largest number that will divide into both a numerator and a denominator).
The greatest common denominator is usually 2, 3, 4, 5, or multiples of these numbers, such as 6, 8, 25, and so on.

**EXAMPLE 1**

\[
\frac{175}{20} = \frac{35}{4}
\]

**EXAMPLE 2**

\[
\frac{63}{6} = \frac{21}{2}
\]

**EXAMPLE 3**

\[
\frac{1075}{250} = \frac{43}{10}
\]

There is a second way you could have reduced the fraction in Example 3, and it is equally as correct. Divide by 5, then by 5 again.

\[
\frac{1075}{250} = \frac{215}{50} = \frac{43}{10}
\]

If the greatest common denominator is difficult to determine, reduce several times by using smaller common denominators.

**EXAMPLE 4**

\[
\frac{376}{40} = \frac{47}{5}
\]

Divide by 8

Or divide by 2, then 2, then 2

\[
\frac{376}{40} = \frac{188}{20} = \frac{94}{10} = \frac{47}{5}
\]

Remember that simple numbers are easiest to work with, and the time spent in extra reductions may be well worth the payoff in safety.

### Problems 2.3

Reduce the fractions in preparation for final division.

1. \( \frac{84}{8} = \) _________
2. \( \frac{20}{16} = \) _________
3. \( \frac{250}{325} = \) _________
4. \( \frac{96}{34} = \) _________
5. \( \frac{175}{20} = \) _________
6. \( \frac{40}{14} = \) _________
REDUCTION OF NUMBERS ENDING IN ZERO

The third type of simplification is not solely related to decimal fractions but is best covered at this time. This concerns reductions in a common fraction when both a numerator and a denominator end with zeros.

Numbers that end in a zero or zeros may be reduced by crossing off the same number of zeros in both a numerator and a denominator.

**EXAMPLE 1**

\[
\frac{800}{250} = \frac{80}{25} \quad \text{Reduce by } 5 = \frac{16}{5}
\]

In this fraction, the numerator, 800, has two zeros, but the denominator, 250, has one zero. The number of zeros crossed off must be the same in both numerator and denominator, so only one zero can be eliminated from each.

**EXAMPLE 2**

\[
\frac{2400}{2000} = \frac{24}{20} \quad \text{Reduce by } 4 = \frac{6}{5}
\]

Two zeros can be eliminated from the denominator and the numerator in this fraction.

**EXAMPLE 3**

\[
\frac{15000}{30000} = \frac{15}{30} \quad \text{Reduce by } 15 = \frac{1}{2}
\]

In this fraction, three zeros can be eliminated.

**Problems 2.4**

Reduce the fractions to their lowest terms.

1. \( \frac{50}{250} = \) _________
2. \( \frac{120}{50} = \) _________
3. \( \frac{2500}{1500} = \) _________
4. \( \frac{1,000,000}{750,000} = \) _________
5. \( \frac{800}{150} = \) _________
6. \( \frac{110}{100} = \) _________

**Answers**

1. \( \frac{21}{2} \)
2. \( \frac{5}{4} \)
3. \( \frac{10}{13} \)
4. \( \frac{48}{17} \)
5. \( \frac{35}{4} \)
6. \( \frac{20}{7} \)
7. \( \frac{41}{14} \)
8. \( \frac{4}{3} \)
9. \( \frac{2}{3} \)
10. \( \frac{15}{22} \)
Chapter 2  Multiplication and Division of Decimals

2

7. \( \frac{200,000}{150,000} = \) ____________
8. \( \frac{1000}{800} = \) ____________
9. \( \frac{60}{40} = \) ____________
10. \( \frac{150}{200} = \) ____________

Answers  
1. 1  
2. \( \frac{12}{15} \)  
3. \( \frac{5}{3} \)  
4. \( \frac{4}{3} \)  
5. \( \frac{16}{3} \)  
6. \( \frac{11}{10} \)  
7. \( \frac{4}{3} \)  
8. \( \frac{5}{4} \)  
9. \( \frac{3}{2} \)  
10. \( \frac{3}{4} \)

USING A CALCULATOR

Calculators vary in how addition, subtraction, division, and multiplication must be entered, and in the number of fractional numbers displayed after the decimal point. The first precaution in calculator use is to ensure you know how to use the one available to you. If you must do frequent calculations, it would be wise to buy and use your own. The next precaution—and this is critical—is to enter decimal numbers correctly, which includes entering the decimal points. This is not as easy to remember as it sounds, and this is a step where dosage calculation errors can occur.

Calculator entry errors tend to be repetitive, so visually check each entry before entering the next.

EXPRESSING TO THE NEAREST TENTH

When a fraction is reduced as much as possible, it is ready for final division. If necessary, this is done using a calculator to divide the numerator by the denominator. Dosage answers are most frequently rounded off and expressed as decimal fractions to the nearest tenth.

To express an answer to the nearest tenth, the division is carried to hundredths (two places after the decimal). When the number representing hundredths is 5 or larger, the number representing tenths is increased by one.

**EXAMPLE 1**  
\[
\frac{0.35}{0.4} = 0.35 \div 0.4 = 0.87
\]

Answer = 0.9

The number representing hundredths is 7, so the number representing tenths is increased by one: 0.87 becomes 0.9.

**EXAMPLE 2**  
\[
\frac{0.5}{0.3} = 0.5 \div 0.3 = 1.66 = 1.7
\]

The number representing hundredths, 6, is larger than 5, so 1.66 becomes 1.7.

**EXAMPLE 3**  
\[
\frac{0.16}{0.3} = 0.53 = 0.5
\]

The number representing hundredths, 3, is less than 5, so the number representing tenths, 5, remains unchanged.
EXAMPLE 4  \[ \frac{0.2}{0.3} = 0.66 = 0.7 \]

EXAMPLE 5  An answer of 1.42 remains 1.4.

EXAMPLE 6  An answer of 1.86 becomes 1.9.

Problems 2.5

Use a calculator to divide the common fractions. Express answers to the nearest tenth.

1. \[ \frac{5.1}{2.3} = \quad \] 6. \[ \frac{2.7}{1.1} = \quad \]
2. \[ \frac{0.9}{0.7} = \quad \] 7. \[ \frac{4.2}{5} = \quad \]
3. \[ \frac{3.7}{2} = \quad \] 8. \[ \frac{0.5}{2.5} = \quad \]
4. \[ \frac{6}{1.3} = \quad \] 9. \[ \frac{5.2}{0.91} = \quad \]
5. \[ \frac{1.5}{2.1} = \quad \] 10. \[ \frac{2.4}{2.7} = \quad \]

Answers  1. 2.2  2. 1.3  3. 1.9  4. 4.6  5. 0.7  6. 2.5  7. 0.8  8. 0.2  9. 5.7  10. 0.9

EXPRESSING TO THE NEAREST HUNDREDTH

Some drugs are administered in dosages carried to the nearest hundredth. This is common in pediatric dosages, and in drugs that alter a vital function of the body, for example, heart rate.

To express an answer to the nearest hundredth, the division is carried to thousandths (three places after the decimal point). When the number representing thousandths is 5 or larger, the number representing hundredths is increased by one.

EXAMPLE 1  0.736 becomes 0.74

The number representing thousandths, 6, is larger than 5, so the number representing hundredths, 3, is increased by one to become 4.

EXAMPLE 2  0.777 becomes 0.78

EXAMPLE 3  0.373 remains 0.37
Chapter 2  Multiplication and Division of Decimals

The number representing thousandths, 3, is less than 5, so the number representing hundredths, 7, remains unchanged.

**EXAMPLE 4** 0.934 remains 0.93

**Problems 2.6**

Express the numbers to the nearest hundredth.

1. 0.175 =
2. 0.344 =
3. 1.853 =
4. 0.306 =
5. 3.015 =
6. 2.154 =
7. 1.081 =
8. 1.327 =
9. 0.739 =
10. 0.733 =
11. 2.072 =
12. 0.089 =

**Answers** 1. 0.18  2. 0.34  3. 1.85  4. 0.31  5. 3.02  6. 2.15  7. 1.08  8. 1.33  9. 0.74  10. 0.73  11. 2.07  12. 0.09

**Summary**

This concludes the chapter on multiplication and division of decimals. The important points to remember from this chapter are:

- When decimal fractions are multiplied manually, the decimal point is placed the same number of places to the left in the product as the total of numbers after the decimal points in the fractions multiplied.
- Zeros must be placed in front of a product if it contains insufficient numbers for the correct placement of the decimal point.
- Excess trailing zeros are eliminated in dosages.
- To simplify fractions for final division, the preliminary steps of eliminating decimal points, reducing the numbers by common denominators, and reducing numbers ending in zeros can be used.
- To express to tenths, increase the answer by one if the number representing the thousandths is 5 or larger.
- To express to hundredths, increase the answer by one if the number representing the thousandths is 5 or larger.
- Practice using a calculator until proficiency is achieved.
- All calculator entries and answers must be double-checked.
- Calculator running totals should be disregarded because they can cause confusion.
- A personal calculator is a must if frequent calculations are necessary.
### Summary Self-Test

**Multiply the decimals. A calculator may be used.**

1. \(1.49 \times 0.05 = \) __________  
6. \(5.3 \times 1.02 = \) __________  
2. \(0.15 \times 3.04 = \) __________  
7. \(0.35 \times 1.25 = \) __________  
3. \(0.025 \times 3.5 = \) __________  
8. \(4.32 \times 0.05 = \) __________  
4. \(0.55 \times 2.5 = \) __________  
9. \(0.2 \times 0.02 = \) __________  
5. \(1.31 \times 2.07 = \) __________  
10. \(0.4 \times 1.75 = \) __________

11. You are to administer four tablets with a dosage strength of 0.04 mg each. What total dosage are you giving? __________
12. You have given 2½ (2.5) tablets with a strength of 1.25 mg per tablet. What total dosage is this? __________
13. The tablets your patient is to receive are labeled 0.1 mg, and you are to give 3½ (3.5) tablets. What total dosage is this? __________
14. You gave your patient 3 tablets labeled 0.75 mg each, and he was to receive a total of 2.25 mg. Did he receive the correct dosage? __________
15. The tablets available for your patient are labeled 12.5 mg, and you are to give 4½ (4.5) tablets. What total dosage will this be? __________
16. Your patient is to receive a dosage of 4.5 mg. The tablets available are labeled 3.5 mg, and there are 2½ tablets in his medication drawer. Is this a correct dosage? __________

**Divide the fractions. Express answers to the nearest tenth. A calculator may be used.**

17. \(\frac{1.3}{0.7} = \) __________  
24. \(\frac{2,000,000}{1,500,000} = \) __________  
18. \(\frac{1.9}{3.2} = \) __________  
25. \(\frac{4.1}{2.05} = \) __________  
19. \(\frac{32.5}{9} = \) __________  
26. \(\frac{7.3}{12} = \) __________
20. \(\frac{0.04}{0.1} = \) __________  
27. \(\frac{150,000}{120,000} = \) __________  
21. \(\frac{1.45}{1.2} = \) __________  
28. \(\frac{0.15}{0.08} = \) __________  
22. \(\frac{250}{1000} = \) __________  
29. \(\frac{2700}{900} = \) __________  
23. \(\frac{0.8}{0.09} = \) __________  
30. \(\frac{0.25}{0.15} = \) __________
Divide the fractions. Express answers to the nearest hundredth. A calculator may be used.

31. \[
\frac{900}{1700} = \frac{\text{__________}}{\text{__________}}
\]
32. \[
\frac{0.125}{0.3} = \frac{\text{__________}}{\text{__________}}
\]
33. \[
\frac{1450}{1500} = \frac{\text{__________}}{\text{__________}}
\]
34. \[
\frac{65}{175} = \frac{\text{__________}}{\text{__________}}
\]
35. \[
\frac{0.6}{1.35} = \frac{\text{__________}}{\text{__________}}
\]
36. \[
\frac{0.04}{0.12} = \frac{\text{__________}}{\text{__________}}
\]
37. \[
\frac{750}{10,000} = \frac{\text{__________}}{\text{__________}}
\]
38. \[
\frac{0.65}{0.8} = \frac{\text{__________}}{\text{__________}}
\]
39. \[
\frac{3.01}{4.2} = \frac{\text{__________}}{\text{__________}}
\]
40. \[
\frac{4.5}{6.1} = \frac{\text{__________}}{\text{__________}}
\]

Answers

1. 0.0745
2. 0.456
3. 0.0875
4. 1.375
5. 2.7117
6. 5.406
7. 0.4375
8. 0.216
9. 0.004
10. 0.7

11. 0.16 mg
12. 3.125 mg
13. 0.35 mg
14. Yes
15. 56.25 mg
16. No
17. 1.9
18. 0.6
19. 3.6
20. 0.4
21. 1.2

22. 0.3
23. 8.9
24. 1.3
25. 2
26. 0.6
27. 1.3
28. 1.9
29. 3
30. 1.7
31. 0.53
32. 0.42

33. 0.97
34. 0.37
35. 0.44
36. 0.33
37. 0.08
38. 0.81
39. 0.72
40. 0.74
41. 0.52
42. 0.36
43. 0.65
44. 0.27
45. 0.85
46. 0.73
47. 0.26
48. 0.93
49. 0.45
50. 0.7
Objectives
The learner will solve equations containing:
1. whole numbers.
2. decimal numbers.
3. multiple numbers.

Prerequisites
Chapters 1 and 2

CHAPTER 3
SOLVING COMMON FRACTION EQUATIONS

The majority of clinical drug dosage calculations involve solving an equation containing one to five common fractions. Two examples are:

\[ \frac{2}{5} \times \frac{3}{4} \quad \text{and} \quad \frac{20}{1} \times \frac{1000}{60,000} \times \frac{1200}{1} \times \frac{1}{60} \]

Two options are available to solve common fraction equations: calculator use throughout, or initial fraction reduction followed by calculator use for final division. Both options are presented in this chapter, and you may use whichever you wish, or whichever your instructor requires.

Common fraction equations are solved by dividing the numerators by the denominators.

It is important that you do the calculations for each example and then compare them with the math provided. Just reading the examples will not teach you the calculation skills you need. The examples and problems provided incorporate all the content covered in the first two chapters. They represent the full range of calculations you will be doing on a continuing basis.

Calculator solution of equations is most safely done by concentrating only on the entries being made, not the numbers that register and change throughout the calculation.

WHOLE-NUMBER EQUATIONS

EXAMPLE 1  
Option 1: Calculator Use Throughout
\[
\frac{2}{5} \times \frac{3}{4} = 0.3
\]

Multiply the numerators, 2 and 3, and then divide by the denominators, 5 then 4, in continuous entries.

Answer = 0.3 (tenth)
Option 2: Initial Reduction of Fractions

\[ \frac{2}{5} \times \frac{3}{4} \]

\[ \frac{1\frac{2}{5}}{3} \times \frac{3}{4} \]

Divide the numerator, 2, and the denominator, 4, by 2 (to become 1 and 2)

\[ 3 \div 5 \div 2 \]

Use the calculator to divide the remaining numerator, 3, by the remaining denominators, 5 and 2

= 0.3

Answer = 0.3 (tenth)

Initial reduction of fractions in an equation can simplify final calculator entries, especially if the numbers are large, or contain decimal fractions or zeros.

EXAMPLE 2

Option 1: Calculator Use Throughout

\[ \frac{250}{175} \times \frac{150}{325} \]

\[ 250 \times 150 \div 175 \div 325 \]

Multiply the numerators, 250 and 150, then divide by the denominators, 175 and 325

= 0.659

Answer = 0.7 (tenth) or 0.66 (hundredth)

Option 2: Initial Reduction of Fractions

\[ \frac{250}{175} \times \frac{150}{325} \]

\[ \frac{10}{3} \times \frac{6}{7} \]

Divide the numerator, 250, and the denominator, 175, by 25 (to become 10 and 7); divide the numerator, 150, and denominator, 325, by 25 (to become 6 and 13)

\[ 10 \times 6 \div 7 \div 13 \]

Use the calculator to multiply the numerators, 10 and 6, then divide by the denominators, 7 and 13

= 0.659

Answer = 0.7 (tenth) or 0.66 (hundredth)
EXAMPLE 3

**Option 1: Calculator Use Throughout**

\[
\frac{7}{50} \times \frac{25}{3} \times \frac{120}{32}
\]

Multiply the numerators, 7, 25, and 120, then divide by the denominators, 50, 3, and 32

\[
\frac{7 \times 25 \times 120}{50 \times 3 \times 32} = \frac{175000}{19200}
\]

\[
= 4.4375
\]

Answer = 4.4 (tenth) or 4.38 (hundredth)

**Option 2: Initial Reduction of Fractions**

\[
\frac{7}{50} \times \frac{25}{3} \times \frac{120}{32}
\]

Divide 25 and 50 by 25, then divide 120 and 32 by 8

\[
\frac{7}{50} \times \frac{25}{3} \times \frac{120}{32} = \frac{7}{2} \times \frac{25}{3} \times \frac{15}{4}
\]

\[
\frac{7 \times 25 \times 15}{2 \times 3 \times 4} = \frac{175000}{19200}
\]

\[
= 4.375
\]

Answer = 4.4 (tenth) or 4.38 (hundredth)

EXAMPLE 4

**Option 1: Calculator Use Throughout**

\[
\frac{20}{1} \times \frac{1000}{60,000} \times \frac{1200}{1} \times \frac{1}{60}
\]

\[
20 \times 1000 \times 1200 \div 60,000 \div 60
\]

\[
= 6.666
\]

Answer = 6.7 (tenth) or 6.67 (hundredth)

**Option 2: Initial Reduction of Fractions**

\[
\frac{20}{1} \times \frac{1000}{60,000} \times \frac{1200}{1} \times \frac{1}{60}
\]

\[
\frac{20}{1} \times \frac{1000}{60,000} \times \frac{1200}{1} \times \frac{1}{60}
\]

\[
20 \div 3
\]

\[
= 6.666
\]

Answer = 6.7 (tenth) or 6.67 (hundredth)

EXAMPLE 5

**Option 1: Calculator Use Throughout**

\[
\frac{2000}{1500} \times \frac{2500}{3000}
\]

\[
2000 \times 2500 \div 1500 \div 3000
\]

\[
= 1.111
\]

Answer = 1.1 (tenth) or 1.11 (hundredth)
Option 2: Initial Reduction of Fractions

\[
\frac{2000}{1500} \times \frac{2500}{3000}
\]

\[
\frac{2}{3} \times \frac{2500}{3000}
\]

\[
2 \times \frac{5}{3} \div 3
\]

= 1.111

Answer = 1.1 (tenth) or 1.11 (hundredth)

Problems 3.1

Solve the equations. Express answers to the nearest tenth and hundredth.
A calculator may be used.

1. \(\frac{3}{8} \times \frac{6}{3} = \) __________ _________

2. \(\frac{3}{4} \times \frac{10}{2} = \) __________ _________

3. \(\frac{3}{5} \times \frac{1050}{40} = \) __________ _________

4. \(\frac{10}{1} \times \frac{750}{40,000} \times \frac{1000}{1} \times \frac{1}{60} = \) __________ _________

5. \(\frac{12}{1} \times \frac{500}{2700} \times \frac{2000}{1} \times \frac{1}{60} = \) __________ _________

6. \(\frac{750}{350} \times \frac{750}{600} = \) __________ _________

7. \(\frac{1000}{2700} \times \frac{1300}{500} \times \frac{70}{50} = \) __________ _________

8. \(\frac{15}{1} \times \frac{2500}{20,000} \times \frac{1000}{1} \times \frac{1}{60} = \) __________ _________

9. \(\frac{8}{1} \times \frac{1000}{5000} \times \frac{100}{1} \times \frac{1}{60} = \) __________ _________

10. \(\frac{750}{500} \times \frac{250}{300} = \) __________ _________

Answers

1. 0.8; 0.75  2. 3.8; 3.75  3. 15.8; 15.75  4. 3.1; 3.13  5. 74.1; 74.07  6. 1.2; 1.17  7. 1.3; 1.35  8. 31.3; 31.25  9. 2.7; 2.67  10. 1.3; 1.25

DECIMAL FRACTION EQUATIONS

Decimal fraction equations raise an instant warning flag in calculations, because it is here that most dosage errors occur. As with whole-number equations, simplifying the numbers by eliminating decimal points and reducing the numbers is an optional first step. If you elect to do the entire calculation with a calculator, be sure to enter the decimal points carefully. Double-check all calculator entries and answers.
Particular care must be taken with calculator entry of decimal numbers to include the decimal point. Each entry and answer must be routinely double-checked.

**EXAMPLE 1**

**Option 1: Calculator Use Throughout**

\[
\frac{0.3}{1.65} \times \frac{2.5}{1}
\]

\[
0.3 \times 2.5 \div 165 \quad \text{Multiply 0.3 by 2.5, then divide by 1.65}
\]

\[= 0.454\]

Answer = 0.5 (tenth) or 0.45 (hundredth)

**Option 2: Initial Elimination of Decimal Points and Reduction of Fractions**

\[
\frac{0.3}{1.65} \times \frac{2.5}{1}
\]

\[
\frac{30}{165} \times \frac{25}{10}
\]

Move the decimal point two places in 0.3 and 1.65 (to become 30 and 165) and one place in 2.5 and 1 (to become 25 and 10)

\[
\frac{3}{33} \times \frac{5}{1}
\]

Divide 30 and 10 by 10, then divide 25 and 165 by 5

\[
\frac{3}{33} \times \frac{5}{1}
\]

Divide 3 and 33 by 3

\[
5 \div 11
\]

Divide the remaining numerator, 5, by the denominator, 11

\[= 0.454\]

Answer = 0.5 (tenth) or 0.45 (hundredth)

**EXAMPLE 2**

**Option 1: Calculator Use Throughout**

\[
\frac{0.3}{1.2} \times \frac{2.1}{0.15}
\]

\[
0.3 \times 2.1 \div 1.2 \div 0.15 \quad \text{Multiply 0.3 by 2.1, then divide by 1.2 and 0.15}
\]

\[= 3.5\]

Answer = 3.5 (tenth) or 3.5 (hundredth)

**Option 2: Initial Elimination of Decimal Points and Reduction of Fractions**

\[
\frac{0.3}{1.2} \times \frac{2.1}{0.15}
\]

\[
\frac{3}{12} \times \frac{210}{15}
\]

Eliminate the decimal points by moving them one place in 0.3 and 1.2 (to become 3 and 12) and two places in 2.1 and 0.15 (to become 210 and 15)
Divide 3 and 12 by 3, then divide 210 and 15 by 5

\[
\frac{1}{\frac{12}{4}} \times \frac{210}{\frac{15}{3}}
\]

Divide 42 and 4 by 2

\[
\frac{1}{\frac{4}{2}} \times \frac{42}{\frac{3}{3}}
\]

Use a calculator to divide the numerator, 21, by 2 and then by 3

\[
21 \div 2 \div 3 = 3.5
\]

Answer = 3.5 (tenth) or 3.5 (hundredth)

**Example 3**

**Option 1: Calculator Use Throughout**

\[
0.15 \times 3.1
0.17 \div 0.17 \div 2
\]

Multiply 0.15 by 3.1, divide by 0.17, and then divide by 2

\[
= 1.367
\]

Answer = 1.4 (tenth) or 1.37 (hundredth)

**Option 2: Initial Elimination of Decimal Points and Reduction of Fractions**

\[
0.15 \times 3.1
0.17 \div 3 \div 2
\]

Move the decimal point two places in 0.15 and 0.17 and one place in 3.1 and 2 (requires adding a zero to 2)

\[
\frac{15}{17} \times \frac{31}{20}
\]

Divide 15 and 20 by 5

\[
3 \times 31 \div 17 \div 4
\]

Complete this with a calculator

\[
= 1.367
\]

Answer = 1.4 (tenth) or 1.37 (hundredth)

**Example 4**

**Option 1: Calculator Use Throughout**

\[
2.5 \times 1.2
2.5 \div 1.2 \div 1.5 \div 1.1
\]

\[
= 1.818
\]

Answer = 1.8 (tenth) or 1.82 (hundredth)
Option 2: Initial Elimination of Decimal Points and Reduction of Fractions

\[
\begin{align*}
2.5 \times & \frac{1.2}{1.1} \\ 25 \times & \frac{12}{11} \\
\frac{5}{3} \times & \frac{12}{11} \\
\frac{5}{3} \times & \frac{\frac{12}{11}}{1} \\
5 \times & 4 \div 11 \\
& = 1.818 \\
\text{Answer} & \quad = 1.8 \text{ (tenth)} \text{ or } 1.82 \text{ (hundredth)}
\end{align*}
\]

Problems 3.2

Solve the equations. Express answers to the nearest tenth and hundredth. A calculator may be used.

1. \( \frac{2.1}{1.15} \times \frac{0.9}{1.2} = \ldots \ldots \) \hspace{1cm} 6. \( \frac{0.75}{1.15} \times \frac{3}{1.25} = \ldots \ldots \)

2. \( \frac{3.1}{2.7} \times \frac{2.2}{1.4} = \ldots \ldots \) \hspace{1cm} 7. \( \frac{10.2}{1.5} \times \frac{2}{5.1} = \ldots \ldots \)

3. \( \frac{0.3}{1.2} \times \frac{3}{2.1} = \ldots \ldots \) \hspace{1cm} 8. \( \frac{0.125}{0.25} \times \frac{2.5}{1.5} = \ldots \ldots \)

4. \( \frac{0.17}{0.3} \times \frac{2.5}{1.5} = \ldots \ldots \) \hspace{1cm} 9. \( \frac{0.9}{0.3} \times \frac{1.2}{1.4} = \ldots \ldots \)

5. \( \frac{1.75}{0.95} \times \frac{1.5}{2} = \ldots \ldots \) \hspace{1cm} 10. \( \frac{0.35}{1.7} \times \frac{2.5}{0.7} = \ldots \ldots \)

Answers

1. 1.4; 1.37 \hspace{1cm} 2. 1.8; 1.8 \hspace{1cm} 3. 0.4; 0.36 \hspace{1cm} 4. 0.9; 0.94 \hspace{1cm} 5. 1.4; 1.38 \hspace{1cm} 6. 1.6; 1.57 \hspace{1cm} 7. 2.7; 2.67 \hspace{1cm} 8. 0.8; 0.83 \hspace{1cm} 9. 2.6; 2.57 \hspace{1cm} 10. 0.7; 0.74

MULTIPLE-NUMBER EQUATIONS

The calculation steps just practiced are also used for multiple-number equations, which occur frequently in advanced clinical calculations. Reduction of numbers may be of particular benefit here because calculations of this type sometimes have numbers that cancel and/or reduce dramatically. Answers are expressed to the nearest whole number in the examples and problems that follow to replicate actual clinical calculations.
EXAMPLE 1

Option 1: Calculator Use Throughout

\[
\frac{60}{1} \times \frac{\frac{1000}{4}}{1} \times \frac{\frac{1}{1000}}{\frac{6}{1}}
\]

Multiply 60 by 1000, then by 6; divide by 4 and 1000

\[
60 \times 1000 \times \frac{6}{4} \div 1000
\]

= 90

Answer = 90

Option 2: Initial Reduction of Fractions

\[
\frac{60}{1} \times \frac{\frac{1000}{4}}{1} \times \frac{\frac{1}{1000}}{\frac{6}{1}}
\]

Eliminate 1000 from a numerator and denominator, then divide 6 and 4 by 2

\[
60 \times 3 \div 2
\]

Multiply 60 by 3, then divide by 2

= 90

Answer = 90

The answer is obtained by cancellation alone

EXAMPLE 2

Option 1: Calculator Use Throughout

\[
\frac{20}{1} \times \frac{\frac{75}{1}}{\frac{1}{60}}
\]

Multiply 20 by 75, then divide by 60

\[
20 \times 75 \div 60
\]

= 25

Answer = 25

Option 2: Initial Reduction of Fractions

\[
\frac{20}{1} \times \frac{\frac{75}{1}}{\frac{1}{60}}
\]

Divide 20 and 60 by 20 to become 1 and 3, then divide 75 and 3 by 3 to become 25 and 1

\[
\frac{20}{1} \times \frac{\frac{25}{3}}{\frac{1}{60}}
\]

= 25

Answer = 25

The answer is obtained by cancellation alone

EXAMPLE 3

Option 1: Calculator Use Throughout

\[
\frac{2}{0.5} \times \frac{\frac{1}{100}}{\frac{275}{1}}
\]

Multiply 2 by 275, then divide by 0.5 and 100

\[
2 \times 275 \div 0.5 \div 100
\]

= 11

Answer = 11
Option 2: Initial Reduction of Fractions

\[
\frac{2}{0.5} \times \frac{1}{100} \times \frac{275}{1}
\]

\[
\frac{20}{5} \times \frac{1}{100} \times \frac{275}{1}
\]

Eliminate the decimal point by moving it one place in 0.5 and one place in 2, which requires adding a zero to 2 (to become 5 and 20)

\[
\frac{1}{\frac{5}{1}} \times \frac{1}{100} \times \frac{55}{1}
\]

Divide 20 and 100 by 20, then divide 275 and 5 by 5

\[
\frac{1}{\frac{5}{1}} \times \frac{11}{1}
\]

Divide 5 and 55 by 5

\[
= 11
\]

Answer = 11

The answer is obtained by cancellation alone

EXAMPLE 4

Option 1: Calculator Use Throughout

\[
\frac{1}{60} \times \frac{1}{12} \times \frac{10}{1} \times \frac{750}{1}
\]

\[10 \times 750 \div 60 \div 12
\]

= 10.4

Answer = 10

Option 2: Initial Reduction of Fractions

\[
\frac{1}{60} \times \frac{1}{12} \times \frac{10}{1} \times \frac{750}{1}
\]

\[
\frac{1}{60} \times \frac{12}{6} \times \frac{10}{1} \times \frac{375}{1}
\]

\[
375 \div 6 \div 6
\]

= 10.4

Answer = 10

Problems 3.3

Solve the equations. Express answers to the nearest whole number.

1. \[
\frac{15}{1} \times \frac{350}{5} \times \frac{1}{60} = \quad \text{__________}
\]

5. \[
\frac{20}{1} \times \frac{1200}{16} \times \frac{1}{60} = \quad \text{__________}
\]

2. \[
\frac{1}{32} \times \frac{60}{1} \times \frac{7.5}{3.1} = \quad \text{__________}
\]

6. \[
\frac{5}{1} \times \frac{320}{1.5} \times \frac{1}{60} = \quad \text{__________}
\]

3. \[
\frac{10}{1} \times \frac{2500}{24} \times \frac{1}{60} = \quad \text{__________}
\]

7. \[
\frac{100}{1} \times \frac{1750}{200} \times \frac{1}{60} = \quad \text{__________}
\]

4. \[
\frac{1.7}{2.3} \times \frac{15.3}{12.1} \times \frac{6.2}{0.3} = \quad \text{__________}
\]

8. \[
\frac{60}{1} \times \frac{1150}{200} \times \frac{1}{100} = \quad \text{__________}
\]
Summary

This concludes the chapter on solving common fraction equations. The important points to remember from this chapter are:

- Most clinical calculations consist of an equation containing one to five common fractions.
- In solving equations, all the numerators are multiplied, then divided by the denominators.
- Numbers in an equation may initially be reduced using common denominators/divisors to simplify final multiplication and division.
- Zeros may be eliminated from the same number of numerators and denominators without altering the value.
- Double-check all calculator entries and answers.
- Answers may be expressed as whole numbers, or to the nearest tenth or hundredth, depending on the calculation being done.

Summary Self-Test

Solve the equations. Express answers to the nearest tenth and hundredth. A calculator may be used.

1. \( \frac{0.8}{0.65} \times \frac{1.2}{1} = \) __________  __________
2. \( \frac{350}{1000} \times \frac{4.4}{1} = \) __________  __________
3. \( \frac{0.35}{1.3} \times \frac{4.5}{1} = \) __________  __________
4. \( \frac{0.4}{1.5} \times \frac{2.3}{1} = \) __________  __________
5. \( \frac{1}{75} \times \frac{500}{1} = \) __________  __________
6. \( \frac{0.15}{0.12} \times \frac{1.45}{1} = \) __________  __________
7. \( \frac{100,000}{80,000} \times \frac{1.7}{1} = \) __________  __________
8. \( \frac{1.45}{2.1} \times \frac{1.5}{1} = \) __________  __________
9. \( \frac{1550}{500} \times \frac{0.5}{1} = \) __________  __________
10. \( \frac{4}{0.375} \times \frac{0.25}{1} = \) __________  __________
11. \( \frac{0.08}{0.1} \times \frac{2.1}{1} = \) __________  __________
Solve the equations. Express answers to the nearest whole number. A calculator may be used.

26. \[
\frac{104}{95} \times \frac{20}{15} \times \frac{63}{16} = \quad \]

27. \[
\frac{40,000}{10,000} \times \frac{30}{1} \times \frac{3.7}{12.5} = \quad \]

28. \[
\frac{60}{1} \times \frac{500}{50} \times \frac{1}{1000} \times \frac{116}{1} = \quad \]

29. \[
\frac{1.5}{0.6} \times \frac{10}{14} \times \frac{3.2}{5.3} \times \frac{100}{2} = \quad \]

30. \[
\frac{60}{1} \times \frac{50}{250} \times \frac{1}{100} \times \frac{455}{1} = \quad \]

31. \[
\frac{33.7}{15.9} \times \frac{19.2}{2.6} \times \frac{2.9}{3.85} = \quad \]

32. \[
\frac{20}{4} \times \frac{100}{88} \times \frac{1200}{250} \times \frac{10}{30} = \quad \]

33. \[
\frac{14}{7.9} \times \frac{88}{8} = \quad \]
34. \( \frac{10}{1} \times \frac{325}{1.5} \times \frac{1}{60} \) = 
35. \( \frac{60}{1} \times \frac{300}{400} \times \frac{1}{800} \times \frac{400}{1} \) = 
36. \( \frac{3.7}{1.3} \times \frac{12}{8} \times \frac{3.1}{7.4} \times \frac{5}{1} \) = 
37. \( \frac{20}{2} \times \frac{125}{25} \times \frac{2}{750} \times \frac{216}{1} \) = 
38. \( \frac{4}{3} \times \frac{45}{1} \times \frac{22.5}{37.8} \) = 
39. \( \frac{7.5}{12.3} \times \frac{55}{5} \times \frac{23.2}{1.2} \) = 
40. \( \frac{1000}{1} \times \frac{50}{250} \times \frac{20}{1} \times \frac{1}{60} \) = 
41. \( \frac{15}{1} \times \frac{1000}{4000} \times \frac{800}{1} \times \frac{1}{60} \) = 
42. \( \frac{15}{1} \times \frac{500}{3} \times \frac{1}{60} \) = 
43. \( \frac{25}{3} \times \frac{750}{8} \times \frac{0.1}{1} \) = 
44. \( \frac{40}{2} \times \frac{250}{50} \times \frac{1}{800} \times \frac{154}{1} \) = 
45. \( \frac{33}{4} \times \frac{75}{40} \times \frac{2}{150} \times \frac{432}{1} \) = 
46. \( \frac{22.5}{7} \times \frac{100}{5} \times \frac{1}{700} \times \frac{3}{80} \times \frac{3150}{1} \) = 
47. \( \frac{100}{250} \times \frac{50}{1} \times \frac{27.5}{1.375} \) = 
48. \( \frac{2.2}{0.25} \times \frac{3.6}{1} \times \frac{3.7}{7.1} \) = 
49. \( \frac{1.3}{0.21} \times \frac{0.3}{2} \times \frac{10.1}{0.75} \) = 
50. \( \frac{27.5}{10} \times \frac{40}{7} \times \frac{8.5}{1.9} \) = 

Answers

1. 1.5; 1.48
2. 1.5; 1.54
3. 1.2; 1.21
4. 0.6; 0.61
5. 6.7; 6.67
6. 1.8; 1.81
7. 2.1; 2.13
8. 1; 1.04
9. 1.6; 1.55
10. 2.7; 2.67
11. 1.7; 1.68
12. 1.7; 1.74
13. 1.2; 1.17
14. 2.6; 2.55
15. 2.4; 2.43
16. 1.8; 1.75
17. 1.6; 1.63
18. 3.8; 3.75
19. 1.2; 1.24
20. 5.8; 5.83
21. 5.6; 5.65
22. 4.2; 4.17
23. 5.7; 5.7
24. 6.7; 6.67
25. 5.1; 5.15
26. 57
27. 36
28. 70
29. 54
30. 55
31. 12
32. 9
33. 19
34. 36
35. 23
36. 9
37. 29
38. 36
39. 130
40. 67
41. 50
42. 42
43. 78
44. 19
45. 89
46. 11
47. 400
48. 17
49. 13
50. 70