

Contents

Introduction

Materials List	iv
Student Materials	iv-vii
Teacher Materials	viii-xiii
Grading	xiii

Units

Unit 1	xiv-43 D
Unit 2	44-87 D
Unit 3	88-131 D
Unit 4	132-175 D
Unit 5	176-219 D
Unit 6	220-263 D
Unit 7	264-307 D
Unit 8	308-351 D
Unit 9	352-395 D
Unit 10	396-439 D

Appendix A

Glossary	440-446
Reference Charts	447-449
Index	450-466

Appendix B

Math Facts and Flash Card Games	467-469
Math Fact Strategies	470
Word Problem Strategies	471
Mental Math Practice and Strategies	472
Speed/Mastery Drill Incentives	473
Test Taking Skills	473

Appendix C

Answers	474-477
Student Page Samples	478

Appendix D

Resource CD Contents	479-480
Math 100-400 Flash Card System	481-482
Teaching Resources	483

Acknowledgments and Credits	484
-----------------------------------	-----

Introduction

Mathematics 4 is built on the thesis that most children can learn, understand, and master mathematical concepts. It seeks to relate math to everyday life and to make it practical. We believe that mathematics should help students achieve the ultimate goal of loving, serving, and glorifying God.

Mathematics 4 introduces concepts in incremental steps, allowing the student to master each increment of a skill before advancing to the next step, meeting several simple concepts simultaneously. Each increment easily becomes a part of his “big picture,” not only because it is small, but also because it fits with what he has already learned.

Students retain what they have learned by consistent, systematic review. *Mathematics 4* uses a system of continuous review. Instead of a grand review at the end of the year, a large part of every day’s work is review. The goal is mastery, not just exposure.

Materials

Student

- **Mathematics 4 Textbook**
- **Student Packet**
 - Graph Worksheets
 - Drill Progress Charts
 - Speed/Mastery Drills
- **Quiz and Test Packet**

Teacher

- **Mathematics 4 Teacher’s Guide**
 - Resource CD
- **Flash Cards**
- **Full Solution Answer Key**

Unit 1

Contents



Lesson 1	2	Lesson 10	27
Understanding Numbers Through Thousands; Multiplication		Quiz 2	
Lesson 2	5	Lesson 11	28
Fractions; Facts About Fractions		Multiplying and Carrying; Factors and Multiples; When to Add, When to Multiply	
Lesson 3	8	Lesson 12	31
Solving Word Problems; Finding Half of a Number Mentally		Rounding to the Nearest Ten or Hundred; Finding Change	
Lesson 4	11	Lesson 13	34
Reading and Writing Decimals; Ordering Decimals With Tenths		Adding and Subtracting Mentally; Doubling Numbers Mentally	
Lesson 5	14	Lesson 14	37
Quiz 1		Carrying Mentally; Multiplying by Tens and Hundreds Mentally	
Lesson 6	15	Lesson 15	40
Placing Decimal Points; Subtraction in Word Problems		Naming Lines; Mental Math Trails	
Lesson 7	18	Lesson 16	43
Rounding Measurements; Changing Units of Measure		Unit 1 Test	
Lesson 8	21		
Borrowing; Finding the Missing Part in Word Problems			
Lesson 9	24		
Metric Units of Length; Solving Two-Step Word Problems			



Student Materials

Textbook

Mathematics 4 is a non-consumable text, designed to be reused year after year. Students write their answers on separate paper. For teacher ease in grading, set up a form for students to follow. Show them in the first math class of the year how you expect them to number their papers. Tell them whether you want their work to be done in spiral-bound notebooks or on notebook paper. *Appendix C* page 478 contains suggestions and samples for ways to have students set up their work pages.

Mathematics 4 is divided into 10 units with 16 lessons each. Lessons 1-4, 6-9, and 11-15 are daily lessons. Lessons 5 and 10 are quiz lessons, and Lesson 16 is the test lesson.

Unit 2

Lesson 1 46

Naming Line Segments and Rays; Division Is the Opposite of Multiplication

Lesson 2 49

Doubling Large Numbers Mentally; More About Division

Lesson 3 52

Measuring Circles

Lesson 4 55

Parallel, Intersecting, and Perpendicular



Lesson 5 58

Quiz 1

Lesson 6 59

Adding and Subtracting Fractions; Division Steps

Lesson 7 62

Finding a Fraction of a Number; Factors



Lesson 8 65

Finding Digit Sums; Multiplying a Three-Digit Number and Carrying

Lesson 9 68

Place Value Through Millions

Lesson 10 71

Quiz 2

Lesson 11 72

Division With a Remainder

Lesson 12 75

Meaning of *Centi* and *Milli*; Carrying Mentally

Lesson 13 78

Checking Division; Multiplying Money

Lesson 14 81

Proper and Improper Fractions

Lesson 15 84

Counting by 12s to 144

Lesson 16 87

Unit 2 Test



Oral Practice

Some lessons include an Oral Practice box after the lesson exercises. Each Oral Practice box contains numbers (including large numbers, fractions, decimals, temperatures, and negative numbers) that students will read aloud to the teacher or helper. A few Oral Practices include dictation. Numbers to dictate are listed on the corresponding Teacher's Guide page.

We Remember

The *We Remember* section systematically reviews concepts taught in earlier lessons. The first exercises in *We Remember* review material from the previous day. The final exercises in *We Remember* review the concept taught in this lesson.

20. Below each bold black exercise number is at least one small, gray reference number. The reference number indicates the textbook page where the concept reviewed in this exercise was taught.

Unit Story

Unit 1 begins with an introduction to math around the world. Units 2-10 each feature a different part of the world where math is used in everyday life and begin with a short story to introduce and depict the geographical theme.

Teaching Boxes

Daily lessons begin with at least one framed and colored teaching box that covers either material from Grade 3 (in Unit 1 and a few in Units 2-5) or new concepts. A few lesson exercises follow each teaching box to reinforce the new material.

Sharpening Your Skills

Math skills must be continually sharpened. The *Sharpening Your Skills* section in each lesson hones those skills day by day. These exercises include Computation, Fact Focus, and Mental Math sections. Exercises in *Sharpening Your Skills* do not have reference numbers.

Computation

Math problems that require computing addition, subtraction, multiplication, and division appear in this section. Students copy and work the problems. Specific instructions in gray tell how to check, when to simplify fractions, and how to write remainders in division. These instructions refer only to computation exercises.

Fact Focus

Some lessons include reviews of simple facts. Students write only the answers without copying the problem. *Fact Focus* may include multiplication and division facts, month numbers, number of days in each month, and measurement equivalents.

Mental Math

Students solve the exercises mentally and write only the answers on their papers.

Quiz or Unit Test

After a concept has been reviewed for five days, it may appear on any quiz or test. Exceptions to the five-day review are Grade 3 mathematics concepts carried over into Unit 1 which may be quizzed or tested after fewer than five days of review.

Just for Fun

Quiz and test lessons include optional enrichment activities to expose students to new concepts. *Just for Fun* activities are neither reviewed nor tested.

Textbook Graphics

Math 3 Refresher Lesson—Review of a concept from CLE Mathematics 300. This symbol is found mostly in Units 1 and 2, with a few appearing in Units 3, 4, and 5.

Did You Know—Informative nuggets, often relating to the unit's geographic topic. These may generate additional discussion and/or research.

We Remember

We Remember—The daily review section continuously reviews skills and concepts.

Unit 3



Lesson 1 90

Digit Sums Shortcut;
Changing From Smaller to Larger
Units of Measure

Lesson 2 93

Two-Place Decimals; Rounding and
Estimating to the Nearest Dollar

Lesson 3 96

Mixed Numbers and Improper
Fractions

Lesson 4 99

Multiplying and Dividing by 10,
100, and 1,000

Lesson 5 102

Quiz 1



Lesson 6 103

Multiplying by Two-Digit Numbers

Lesson 7 106

Finding Factors Using Divisibility
Rules for 2, 5, and 10

Lesson 8 109

Reading and Writing Numbers
Through
Millions;
Estimating
Sums and Differences



Lesson 9 112

Naming Triangles

Lesson 10 115

Quiz 2

Lesson 11 116

Five Steps in Long Division

Lesson 12 119

Multiplying Two-Digit Numbers
by Tens

Lesson 13 122

Checking Multiplication;
Common Solids

Lesson 14 125

Checking Addition and
Subtraction; Gram, Kilogram,
and Metric Ton

Lesson 15 128

One Fourth Inch

Lesson 16 131

Unit 3 Test



Sharpening Your Skills

Sharpening Your Skills—Computation, Fact Focus, and Mental Math.

Glossary, Reference Charts, Index

Students can work more independently when they are able to look up information as needed. The *Glossary*, *Reference Charts*, and *Index* are tools to help them achieve this goal. The *Glossary* defines terms used throughout the course. The first time glossary terms are used in textbook lessons, they are in **bold print**. The *Reference Charts* provide definitions, diagrams, equivalent measures, geometry, and abbreviations. The *Index* contains topics under various headings and the page number where they can be found.

Unit 4

Lesson 1 134

Changing Mixed Numbers to Improper Fractions

Lesson 2 137

Finding Factors Using Divisibility Rules for 3 and 9

Lesson 3 140

Perimeter and Area; Time Patterns

Lesson 4 143

Area of Squares and Rectangles; Looking for Addends That Equal 10

Lesson 5 146

Quiz 1

Lesson 6 147

Using Digit Sums to Check Multiplication

Lesson 7 150

Multiplying Decimals by 10 or 100

Lesson 8 153

Congruent and Similar Figures; Counting by 11s to 132

Lesson 9 156

Reading Dials

Lesson 10 159

Quiz 2

Lesson 11 160

Three-Digit Dividends, Two-Digit Quotients



Lesson 12 163

Equal Decimals

Lesson 13 166

Writing Remainders as Fractions

Lesson 14 169

Finding Factors Using Multiples of 4, 6, 7, and 8

Lesson 15 172

Decimals and Money

Lesson 16 . . . 175

Unit 4 Test



Drill Progress Charts

An optional Drill Progress Chart comes before each unit's set of speed and mastery drills in the student packet. Students color the spaces each day according to the number of drill problems they answered correctly in the given time. See *Appendix C* page 473 for more drill incentive ideas.

Speed/Mastery Drills

Speed Drills have 35 facts—addition, subtraction, multiplication, or division. Mastery Drills have 20 problems—measurement equivalents, month facts, and polygons. Unit 1 has sixteen Speed Drills. Units 2-10 each have thirteen Speed Drills and three Mastery Drills. Distribute drills at the beginning of each math class. Time students for one minute to complete as many problems as they can.

Student Packet

The Student Packet contains additional materials needed throughout the course. The graph worksheets, drill progress sheets, and drills are designed for the student to write on. Separate the pages from the packet and file them for easy retrieval when needed, or store them as packets and separate when needed.

Graph Worksheets

Graph worksheets are used in Units 5-10. These worksheets are at the top of the Student Packet. Some worksheets are used in more than one lesson—either collect and redistribute, or have students keep them until they are needed again.

Quiz and Test Packet

The quizzes and tests are designed for the student to write on. Each quiz is on one two-sided sheet. Each test is on a larger folded sheet with a cover and three working pages. Distribute quizzes in Lessons 5 and 10 and tests in Lesson 16 of each unit. Separate, collate, and file the quizzes by quiz and test number or store them in the booklet and separate as needed.

Teacher Materials

Teacher's Guide

The goal for *Mathematics 4* Teacher's Guide is to enable teachers of all levels of experience to successfully teach this course. The Teacher's Guide includes replicas of each student page with answers, complete lesson plans for each lesson, additional resources in the Appendixes, and a *Resource CD* with posters, charts, and practice sheets for teaching the lessons.

Discussion Points

Each unit begins with a list of questions and suggestions to help generate discussion about the unit story on the next page. Use and/or adapt as time and interest allows.

Reflect—Units 2-10

Before beginning each unit, you may take some time to reflect on the material in the previous unit. Use this list of ideas or come up with your own reflections.

Assess

At the beginning of a unit is a good time to assess students' math skills. Use this list as a reminder of items to randomly check. Add your own as needed.

Unit Material, Terms, and Symbols

The concepts taught in the unit are categorized by addition, subtraction, geometry, measures, word problems, etc. In the sidebar are the new terms and symbols in the unit. Use these lists as reference, to preview the unit, or to review at the end of the unit.

Unit 5



Lesson 1 178

Ordering Decimals With Hundredths; Common Factors

Lesson 2 181

Multiplying Three Factors

Lesson 3 184

Volume

Lesson 4 187

Changing Improper Fractions to Whole or Mixed Numbers



Lesson 5 190

Quiz 1

Lesson 6 191

Reducing Fractions

Lesson 7 194

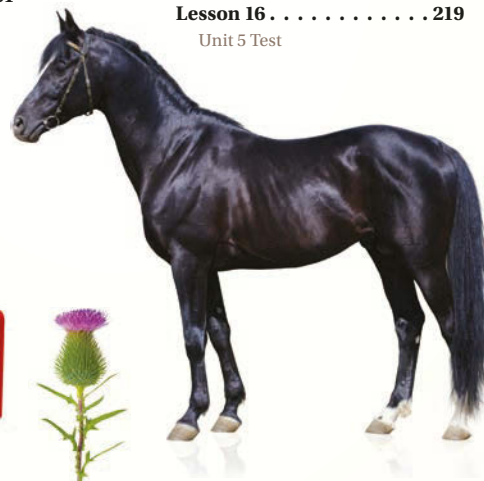
Making Equal Fractions

Lesson 8 197

Borrowing Mentally

Lesson 9 200

Rounding in the Middle of a Number



Lesson 10 . . . 203

Quiz 2

Lesson 11 204

Measuring Volume

Lesson 12 207

Making Equal Fractions With a Given Denominator

Lesson 13 210

Types of Graphs

Lesson 14 213

Pictographs That Show Halves

Lesson 15 216

Making a Pictograph


Lesson 16 219

Unit 5 Test

Student Page

A replica of the textbook page appears on each corresponding Teacher's Guide page. Answers are **red**. Where answers do not fit on the page, a note tells the appendix page where the answer is given. Solutions are shown in detail in the *Full Solution Answer Key*.

Materials Needed

Check here for a list of materials needed for the day's lesson. Flash Card sets vary from day to day; assemble the needed cards before class to save time and activity during class. The Speed/Mastery Drill listed is the same as the lesson number. Posters, charts, and practice sheets are in the *Resource CD* and are indicated in this list by a CD icon  and a poster number.

Unit 6



Lesson 1 **222**
Keys to Finding Common Factors

Lesson 2 **225**
Introducing Circumference
of a Circle

Lesson 3 **228**
Ratios Compare Measurements

Lesson 4 **231**
Finding Circumference Using
Diameter

Lesson 5 **234**
Quiz 1

Lesson 6 **235**
Reducing Fractions and Improper
Fractions to Simplest Form

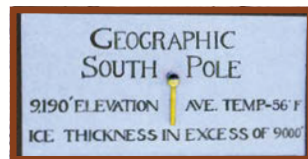
Lesson 7 **238**
Ratios Compare Amounts

Lesson 8 **241**
Using Digit Sums to Check
Addition; Multiplication Facts of 12

Lesson 9 **244**
Counting Across Zero

Lesson 10 **247**
Quiz 2

Lesson 11 **248**
Multiplying Three-Digit Numbers
by Two-Digit Numbers



Lesson 12 **251**
Area of Triangles

Lesson 13 **254**
Rounding Numbers With Nine

Lesson 14 **257**
One Minus a Fraction

Lesson 15 **260**
Special Temperatures;
Counting by Sixteens

Lesson 16 **263**
Unit 6 Test



► Speed/Mastery Drill

Distribute the day's drill and time the students for one minute to complete as many facts as they can. Instruct students either to trade drills for grading or to grade their own. Speed or Mastery Drill problems with answers are in the Teacher's Guide in the sidebar of the third page of each lesson (second page of quiz lessons). Have students color the appropriate number of spaces on their Drill Progress Charts. Incentives on the charts may be varied to fit your classroom. *Appendix B* page 473 gives more ideas for drill incentives, using the progress charts or otherwise.

If several students are not doing well on speed drills, occasionally skip a day's drill and spend extra time practicing the facts on the skipped drill. Have any students who need the extra practice, work the drill at another time (possibly as homework).

► Mental Computations

Being able to compute math mentally is a valuable

life skill. Math lessons, speed drills, and flash cards provide practice in reading math facts and giving answers. Mental Computations provide practice in hearing math facts and giving answers. The combinations begin short and simple—two numbers to add, subtract, multiply, or divide. They gradually become longer with various operations. At the beginning of each math class take time to drill mental computations. Instruct students to raise a hand when they have the answer—after hearing *equals*. Read the first number. Pause to give students time to picture the number. Read the operator (+, −, ×, ÷) and the next number. Pause to allow students to figure the answer. Continue reading and pausing until you reach the equals sign, then say, “equals.”

Lesson Overview

► Flash Card Drill

Begin math class with flash card practice. To take students through a systematic review, the daily lessons drill multiplication and/or division flash cards, and quiz and test lessons drill addition and subtraction. Add more cards if needed and if time allows. Decide ahead of time the method/game/activity for flash card drill. Rotate activities to keep this drill time fresh and students engaged. *Appendix B* pages 467-469 explains regular flash card procedures and provides a wealth of flash card games and other math activities.

► Review

Each lesson contains exercises to review the concepts that were taught in the previous lesson. Answers are **green**. Spend a few minutes reviewing before teaching the lesson.

► Teach

This is a list of the new concept(s) that will be taught in the lesson.

► Oral Practice

After teaching the lesson, listen to students read the numbers in the Oral Practice box.

► Dictation

Dictate these numbers to students after teaching the lesson. See page xi for dictation instructions.

► Assign

This is a list of the sections of student exercises in daily lessons or the quiz or test to be administered in the quiz and test lessons.

Teaching the Lesson

► Daily Lessons

Refer to the colored teaching box and to this section for teaching each part of the lesson. Text in this section is intended to enhance and further explain without merely repeating material from the textbook. Familiarize yourself with both the teaching box and Teaching the Lesson. In the Teacher's Guide new terms are ***bold italic***. Board exercises are **bold**, and the answers are **green**. Write board exercises on the board before class or as the lesson is taught. Work examples as directed and call on students to work other examples.

► Quiz and Test Lessons

Use the exercises in the Review section to prepare students for problems they have not yet encountered on a quiz or test.

Administer the quiz or test. Have students clear their desks except for pencils, erasers, and any other needed

Unit 7



Lesson 1 266
Counting Zeros to Multiply

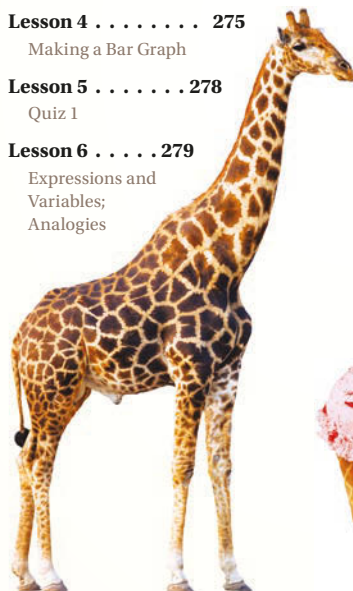
Lesson 2 269
Rounding Tenths to Whole Numbers

Lesson 3 272
Types of Angles

Lesson 4 275
Making a Bar Graph

Lesson 5 278
Quiz 1

Lesson 6 279
Expressions and Variables;
Analogies



Lesson 7 282
Estimating Multiplication;
Multiplication Facts of 11

Lesson 8 285
Adding or Subtracting Mixed Numbers; If/Then Statements

Lesson 9 288
Rounding Numbers
With Two Nines

Lesson 10 291
Quiz 2

Lesson 11 292
Multiplying Three-Digit Numbers
by Three-Digit Numbers

Lesson 12 295
Comparing Positive and Negative Numbers

Lesson 13 298
Simplifying Expressions

Lesson 14 301
Simplifying Mixed Numbers With Improper Fractions

Lesson 15 304
Writing Dates With Numbers;
What Would Equal 100?

Lesson 16 307
Unit 7 Test



tools (ruler, protractor, etc.). Distribute the quiz or test and give students time to take it. If you have allowed a set amount of time for the test, let students know how much time they will be given. Solutions and answers are **red** on the student page in the Teacher's Guide.

Assign *Just for Fun* on the student page. This optional activity is intended to be enjoyed by students who finish the quiz or test before class time is over. You may choose to work some *Just for Fun* activities as a class.

Assign Class Work

► Lesson Alert

Exercises that may need special attention are noted here. Extra lines provide a place for additional alerts.

Unit 8



Lesson 1 310

Simplifying Expressions in the Right Order

Lesson 2 313

Adding and Subtracting Mixed Numbers and Whole Numbers

Lesson 3 316

Lowest Common Multiple

Lesson 4 319

Finding the Vertex and Naming Angles

Lesson 5 322

Quiz 1



Lesson 6 323

Simplifying Expressions With Parentheses

Lesson 7 326

Adding and Subtracting Time



Lesson 8 329

A Quicker Way to Find LCM

Lesson 9 332

Finding Numbers That Equal 100

Lesson 10 335

Quiz 2

Lesson 11 336

Three-Digit Quotients

Lesson 12 339

Borrowing to Subtract Fractions

Lesson 13 342

Using a Protractor

Lesson 14 345

Using Digit Sums to Check Subtraction

Lesson 15 348

Expanding Numbers Vertically; Subtracting From 100

Lesson 16 351

Unit 8 Test

Assign We Remember and Sharpening Your Skills

After the lesson is taught and the accompanying lesson exercises completed, assign *We Remember* and *Sharpening Your Skills*. Students should be able to complete these exercises independently. Any exercises not completed in class time should be completed before the next day's class.

Decide if a struggling student must work all of the computation exercises. If multiple problems review the same operation, you may allow him to work just one of them. If that one is worked correctly, he may skip the others.

Extra Practice

The *Extra Practice* list provides additional examples to review the concept(s) taught in the lesson. Answers are **green**.

Just For Fun

A *Just for Fun* activity appears in quiz and test lessons. Any additional explanation or discussion

relating to the *Just for Fun* activity in this lesson is included here.

Student Helps

Student Helps in the sidebars include tips, explanations, shortcuts, practice, games, etc. that may help students better understand the material taught in the lesson.

Manipulative Math

Some *Student Helps* are labeled *Manipulative Math*. These sections suggest ways of using manipulatives to understand the newly-taught material. Manipulatives help students better understand a concept by giving a concrete image of an abstract concept.

Assign the lesson exercises

Assign the exercises following the teaching box(es) after teaching the lesson and before *We Remember*. If students do not understand part or all of the lesson, consider working these exercises together in class.

Listen to Oral Practice

Call on students individually and listen as they read the numbers (fractions, decimals, temperatures, etc.) to ensure they are reading accurately.

Dictation

Instruct students to number their papers. Read each number from the list in the sidebar. Read clearly, pause, and repeat the number. Give students time to write the number before moving on to the next number.

Ideas for manipulatives include linking math cubes, LEGOs or other blocks, toothpicks, candies, or any small objects that can be manipulated into groups. Consider obtaining from an educational supply store a set of base ten counting blocks—individual cubes to represent ones, sticks of 10 cubes to represent tens, sheets of 100 cubes to represent hundreds, and large cubes of 1,000 to represent thousands.

► Extra Challenge/Activity

Use extra challenges for students who finish early and need more to do. For additional work, students may conduct further research based on the story and photos in the beginning of the unit or from any *Did You Know* nuggets throughout the unit.

Use extra activities as time and need allow to reinforce math concepts.

Speed/Mastery Drill

The sidebar on the third page of each lesson contains a list of all the exercises and answers from that lesson's Speed Drill or Mastery Drill.

Teaching Tips

Teaching Tip
Additional teaching tips are scattered throughout the Teacher's Guide on yellow sticky notes. Use these tips as you see fit—these tips as you see fit.

Additional teaching tips are scattered throughout the Teacher's Guide on yellow sticky notes. Use these tips as you see fit—if they help and if time allows.

Appendixes A-D

Appendix A consists of the textbook glossary, reference charts, and index. *Appendix B* has games, activities, strategies, and skills to supplement the Teacher's Guide. *Appendix C* contains student answers that don't fit on the student pages in the Teacher's Guide and samples of student page setups. *Appendix D* supplies a list of the

Unit 9

Lesson 1	354	Lesson 10	379
Metric Units for Liquids; Drawing Angles		Quiz 2	
Lesson 2	357	Lesson 11	380
Division With 0 in the Quotient		Congruent Angles	
Lesson 3	360		
Adding Time With Carrying			
Lesson 4	363		
Making a Line Graph			
Lesson 5	366	Lesson 12	383
Quiz 1		Finding Square Roots; Dividing Money	
Lesson 6	367	Lesson 13	386
Squaring a Number		Sets	
Lesson 7	370	Lesson 14	389
Subtracting Time With Borrowing		Metric Units of Length With Decimals	
Lesson 8	373	Lesson 15	392
Finding Averages		Drawing Congruent Angles	
Lesson 9	376	Lesson 16	395
Measuring to the Eighth-Inch		Unit 9 Test	



material on the *Resource CD*, a list of sets in the CLE Flash Cards program, and a list of teaching resources (books, manipulatives, and websites).

Flash Cards

CLE offers two sets of flash cards: Addition and Subtraction Flash Cards and Multiplication and Division. Addition and subtraction cards are coded with red-tabbed letters A through M. Use the Grade 2 coded tabs for Math 4 quiz and test lessons. To use non-CLE flash cards, see *Appendix D* pages 481 and 482 for a list of the facts to put in each addition and subtraction set. Multiplication and division cards are not coded. See *Appendix B* pages 467-469 for a list of flash card games and activities.

Unit 10

Lesson 1 398

Metric Units for Liquids
With Decimals



Lesson 2 401

Rounding to the Nearest
Fourth-Inch

Lesson 3 404

Sets With Many Members

Lesson 4 407

Prime and Composite Numbers

Lesson 5 410

Quiz 1

Lesson 6 411

Keys to Finding Prime Numbers

Lesson 7 414

One Half and Tenths

Lesson 8 417

One Half and Hundredths

Lesson 9 420

The Square Root
Symbol

Lesson 10 423

Quiz 2

Lesson 11 424

Dry Food Measures

Lesson 12 427

Symmetry and Asymmetry;
Symmetrical Patterns

Lesson 13 430

Completing Symmetrical Shapes

Lesson 14 433

Finding Places on a Grid

Lesson 15 436

Scale Drawing on a Grid

Lesson 16 439

Unit 10 Test



Glossary 440

Reference 448

Index 451

Credits 468

Full Solution Answer Key

The *Full Solution Answer Key* provides answers to all *Mathematics 4* exercises and, where applicable, detailed solutions. Final answers are black. Where answers have solutions, the exercise copied from the textbook is green, and the solution is gray.

Grading

Daily Lessons

Answers are printed in **red** on the Teacher's Guide student page. Answers that do not fit can be found in *Appendix C* pages 474-477. For best results, grade student papers as soon as possible. To check students' worked solutions, see the *Full Solution Answer Key*. Record the scores and return papers to students so they can learn from any wrong answers. If students are consistently missing specific types of problems, spend extra time with review or other remedial material.

Resource CD

The *Resource CD* is inside the back cover of the Teacher's Guide. It contains posters, charts, and practice sheets for use in teaching and reviewing daily lessons. Print and file the posters and charts ahead of time or print them as needed. Laminate the charts to make them sturdier and reusable for write on/wipe off activities. Print practice sheets as needed for each student.

The first page on the CD lists the contents with interactive links. Click on the poster name or number to be taken directly to that poster. The Teacher's Guide *Appendix D* pages 479-480 contains a list of the materials on the CD.

Quizzes and Tests

Quiz and test answers and solutions are in **red** on the replicated quiz and test pages in the Teacher's Guide. Each quiz and test has a total of 100 points. Direction lines indicate how many points each problem is worth. Count the number of points missed and subtract from 100 to find the score.

Analyze student quizzes and tests. Several students missing the same problems may indicate a weakness in that area. Revisit the areas and make sure students understand the concept. Plan extra class review to strengthen the concept. A student who misses the same type of problem on quiz after quiz (or test) may need some remedial help.

Unit 1

Welcome students to *Mathematics 4*, Unit 1. Read and discuss the story *Math Around the World* on page 1.

Discussion Points

- Talk about any coins you have from countries other than your own and how you got them.
- Share some activities that you have done with your grandparents (or other older relatives).
- What are some of your most valuable memories?
- What items besides coins might a traveler collect?

For extra work, encourage students to research any of these math-related topics for any of the countries mentioned in *Math Around the World*.

- money exchange rates
- population
- lengths of borders
- lengths of rivers

Unit 1



Contents

Lesson 1	2	Lesson 9	24
Understanding Numbers Through Thousands; Multiplication		Metric Units of Length; Solving Two-Step Word Problems	
Lesson 2	5	Lesson 10	27
Fractions; Facts About Fractions		Quiz 2	
Lesson 3	8	Lesson 11	28
Solving Word Problems; Finding Half of a Number Mentally		Multiplying and Carrying; Factors and Multiples; When to Add, When to Multiply	
Lesson 4	11	Lesson 12	31
Reading and Writing Decimals; Ordering Decimals With Tenths		Rounding to the Nearest Ten or Hundred; Finding Change	
Lesson 5	14	Lesson 13	34
Quiz 1		Adding and Subtracting Mentally; Doubling Numbers Mentally	
Lesson 6	15	Lesson 14	37
Placing Decimal Points; Subtraction in Word Problems		Carrying Mentally; Multiplying by Tens and Hundreds Mentally	
Lesson 7	18	Lesson 15	40
Rounding Measurements; Changing Units of Measure		Naming Lines; Mental Math Trails	
Lesson 8	21	Lesson 16	43
Borrowing; Finding the Missing Part in Word Problems		Unit 1 Test	



Fresh produce stand in France.



Roadside stand in Africa.

Getting Started

Mathematics is the science of numbers and their operations and the relationships between numbers.

Numbers have been around since God created time in the beginning. “And the evening and the morning were the first . . . second . . . third . . . fourth . . . fifth . . . sixth . . . day.” (Genesis 1:5, 8, 13, 19, 23, 31). Since then people around the world have been using numbers. Every day of our lives, whether we think about it or not, we employ numbers in various ways—from telling time to counting places to set at the table, from giving or receiving change to measuring a board or piece of fabric.

Numbers play a large part in our lives, so teach students to recognize, enjoy, and appreciate them. Have students describe a day of their recent summer vacation. See if

they can find a link between each activity and math. Take time in the first lesson to show students how you want them to set up their work pages. See *Appendix C* page 478 for examples to use or to adapt to your preference. Change the format later if you see a better way for students or for your own grading ease.

Remind students to copy exercise numbers and problems neatly and accurately. Even if a wrongly-copied problem is accurately figured, the answer will be wrong. Insist that students use sharp pencils and have access to good erasers.

Quiz 2

Interesting Shapes

The opposite sides of a parallelogram are the same length and parallel to each other.

When a parallelogram has all equal sides, it becomes a rhombus.



parallelogram



rhombus

When a rhombus has square corners, it becomes a square.



rhombus



square

When a parallelogram has square corners, it becomes a rectangle.



parallelogram



rectangle

When a rectangle is squeezed on two sides, it becomes a trapezoid.



rectangle



trapezoid

Look around. List items with each of the following shapes.

1. rectangles

2. rhombuses

3. squares

4. trapezoids



A postage stamp can be in the shape of a rectangle.



The flag of Brazil contains a rhombus.



Many road signs are shaped like squares.



Some windows are shaped like trapezoids.

Lesson 10 – Quiz 2 115

Lesson 10

Page 115

Materials Needed

Flash Cards: Sets H & I
Speed Drill 10 for each student

Lesson Overview

Flash Card Drill

Speed Drill

Mental Computations

$$7 + 21 + 100 - 1 = 127$$

$$9 \div 3 + 25 \div 7 = 4$$

$$2 \times 2 + 2 \times 2 + 2 = 14$$

$$\text{double } 25 - 40 + 8 = 18$$

Review

- › Counting by 12s
- › Digit sums shortcut
- › Changing from smaller to larger units
- › Decimals place value through hundredths
- › Reading and writing two-place decimals
- › Rounding and estimating to the nearest dollar
- › Mixed numbers and improper fractions

Administer

- › Quiz 2

Assign

- › *Just for Fun* (optional)

Teaching the Lesson—Quiz 2

Review to prepare for Unit 3 Quiz 2.

Administer Quiz 2.

Materials needed for quiz—pencil and eraser.

Instruct students to work all quiz exercises carefully and to check all answers before turning in the quiz.

Assign *Just for Fun*, page 115, to be completed in the remaining class time.

Just for Fun

Discuss the description of each of these shapes: parallelogram, rhombus, square, rectangle, and trapezoid. Discuss how they are related. Each of these shapes has four sides. Squares, rhombuses, and rectangles are all types of parallelograms. Have students identify objects in the school, neighborhood, etc. that have these shapes.

Quiz 2 Review

- › Count by 12s to 144.
12 24 36 48 60 72 84 96 108 120 132 144
- › Find the digit sums. Use the shortcut.
5,630 5
487,321 7

Continued on page 115 A.

Speed Drill 10

1. $8 \overline{)64}$ 8
2. $3 \overline{)9}$ 3
3. $9 \overline{)63}$ 7
4. $6 \overline{)18}$ 3
5. $8 \overline{)72}$ 9
6. $8 \overline{)56}$ 7
7. $7 \overline{)28}$ 4
8. $2 \overline{)0}$ 0
9. $7 \overline{)42}$ 6
10. $6 \overline{)12}$ 2
11. $4 \overline{)28}$ 7
12. $5 \overline{)40}$ 8
13. $9 \overline{)72}$ 8
14. $6 \overline{)30}$ 5
15. $8 \overline{)48}$ 6
16. $7 \overline{)56}$ 8
17. $7 \overline{)21}$ 3
18. $5 \overline{)30}$ 6
19. $3 \overline{)24}$ 8
20. $9 \overline{)54}$ 6
21. $9 \overline{)18}$ 2
22. $3 \overline{)18}$ 6
23. $8 \overline{)32}$ 4
24. $6 \overline{)48}$ 8
25. $8 \overline{)24}$ 3
26. $3 \overline{)27}$ 9
27. $9 \overline{)36}$ 4
28. $8 \overline{)40}$ 5
29. $6 \overline{)36}$ 6
30. $9 \overline{)45}$ 5
31. $9 \overline{)81}$ 9
32. $7 \overline{)14}$ 2
33. $9 \overline{)27}$ 3
34. $4 \overline{)16}$ 4
35. $8 \overline{)16}$ 2

Math 4

Unit 3

Quiz

2

Name _____

Date _____

80	Score
100	

Solve the word problem. (3 points each answer, label, and solution.) [9]

1. In the morning $\frac{7}{9}$ of a brick of peat was beside the fireplace. During the afternoon a storm came up, and Mother burned $\frac{2}{9}$ of the brick to keep the house warm. How much of the brick was left?

Work Space

$$\frac{7}{9} - \frac{2}{9} = \frac{5}{9}$$

$\frac{5}{9}$ **of a brick**

Follow the directions. (1 point each blank.) [17]

2. Add $38 + 55$ mentally. **93**
3. Write a decimal for Figure A. **1.30**
4. Write a mixed number and an improper fraction for Figure B. **$2\frac{3}{5}$** **$\frac{13}{5}$**
5. Write a whole number and an improper fraction for Figure C. **2** **$\frac{6}{3}$**
6. Complete the first twelve multiples of **12**.
- 12 **24** **36** **48** **60** **72**
84 **96** **108** **120** **132** **144**

Figure A

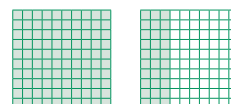


Figure B



Figure C



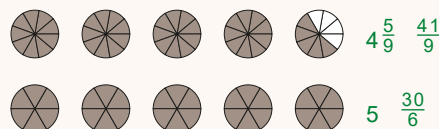
Estimate each answer. Show your work. (3 points each.) [6]

7. $\$43.50 + \21.12 **$\$44.00 + \$21.00 = \$65.00$**
8. $\$12.49 - \8.78 **$\$12.00 - \$9.00 = \$3.00$**

1

Continued from page 115.

- Change the measurements.
 32 quarts = 8 gallons
 9 feet = 3 yards
- Name the place value of the digits in 5.28.
 8 **hundredths**
 5 **ones**
 2 **tenths**
- Write four and eighteen hundredths as a decimal using digits.
4.18
- Write 17.93 using words.
seventeen and ninety-three hundredths
- Estimate the answers.
 $\$37.28 + \9.81 **$\$47.00$**
 $\$72.57 - \30.45 **$\$43.00$**
- Write a whole or mixed number and an improper fraction.



Write the answers. (2 points each.) [24]

9. 8 yd = 24 ft $24 \div 3 = 8$

10. 40 qt = 10 gal $40 \div 4 = 10$

11. **Centi** means one of 100 parts.

12. Milli means one of 1,000 parts.

13. In **326.19** the digit in the hundredths place is **9**.

14. Write 2.09 using words. two and nine hundredths

15. Write **fifty-seven hundredths** as a decimal using digits. 0.57

16. Write 72,017,550 in expanded form. $\frac{70,000,000}{10,000} + \frac{2,000,000}{7,000} + \frac{500}{50}$

Write the digit sums. Use the shortcut when possible. (2 points each.) [8]

17. ~~376~~ 7

18. $\begin{array}{r} 728 \\ 8 \end{array}$

19. ~~4,5~~81 9
p. 90
 $8 + 1 = 9$

20. 521 $\begin{array}{r} 8 \\ \hline \end{array}$
p. 65
 $5 + 2 + 1 = 8$

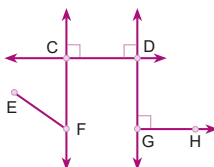
Write *true* if the statement is *true* or *false* if it is *false*. (1 point each.) [6]

21. \overleftrightarrow{CD} is perpendicular to \overleftrightarrow{CF} . true

22. \overrightarrow{GH} is perpendicular to \overline{EF} . false

23. \overleftrightarrow{CF} is parallel to \overleftrightarrow{DG} . true

24. \overleftrightarrow{DG} intersects \overline{EF} . false



25. $\frac{12}{11}$ is a proper fraction. false

26. The factors of 4 are 1, 2, and 4. true

Solve. Write = 1 beside fraction answers that equal 1. (3 points each answer and check.) [30]

27. $\begin{array}{r} 296 \\ \times 3 \\ \hline 888 \end{array}$

28. $\begin{array}{r} \overset{4}{\text{\$}} \overset{5}{3} . 6 8 \\ \times 7 \\ \hline \text{\$} 2 5 7 6 \end{array}$

29. p. 59
$$\begin{array}{r} \frac{6}{13} \\ + \frac{2}{13} \\ \hline \frac{8}{13} \end{array}$$

30. p. 59
$$\begin{array}{r} \frac{4}{19} \\ + \frac{7}{19} \\ \hline \frac{11}{19} \end{array}$$

31. $\frac{9}{14} + \frac{5}{14} = \frac{14}{14} = 1$

32. $5 \overline{) 21}$ 4 R1
p. 72
 $\underline{20}$
1

33. $6 \overline{)18}$ ☒ $\times 3$
p. 59, 78 $\frac{18}{0}$ $\frac{18}{18}$

34. $8 \overline{) 62} \begin{matrix} 7 \text{ R}6 \\ \underline{56} \\ 6 \end{matrix}$ $\begin{matrix} 8 \\ \times 7 \\ \hline 56 \\ + 6 \\ \hline 62 \end{matrix}$

Teacher Notes

Lesson 11

Pages 116-118

Materials Needed

Flash Cards: $\div 7$ and $\times 0$
Speed Drill 11 for each student

17 Triangles

18 Division Steps

Lesson Overview

Flash Card Drill

Speed Drill

Mental Computations

$$\begin{aligned} 7 \times 5 + 2 - 7 &= 30 \\ 11 - 3 \times 5 + 50 &= 90 \\ 3 + 5 + 9 - 10 &= 7 \\ 30 \times 7 + 10 &= 220 \end{aligned}$$

Review

- Name the largest triangle on the poster. **Δ NOS**
(Order of letters may vary.)

Teach

- Five Steps in Long Division

Oral Practice

Dictation

- 39,247,009
- 1,256,081
- 10,010,010
- 303,300,003

Recitation

Assign

- Lesson Exercises
- We Remember
- Sharpening Your Skills

Unit 3

11

Flash Cards: $\div 7$ and $\times 0$

Speed Drill 11

Five Steps in Long Division

Five Steps in Long Division

Division with larger numbers requires five steps. The fifth step is the **bring down** step.

Steps to Solve Long Division Problems

- Divide $9 \div 2 = ?$
- Multiply $4 \times 2 = 8$
- Subtract $9 - 8 = 1$
- Compare $1 < 2$

$$\begin{array}{r} 48 \text{ R}1 \\ 2 \overline{)97} \\ \underline{-8} \\ 17 \\ \underline{-16} \\ 1 \end{array}$$

- Bring down the 7. Now start over with step 1.

Copy and solve.

$$1. 3 \overline{)53} \quad 17 \text{ R}2$$

$$2. 5 \overline{)64} \quad 12 \text{ R}4$$

$$3. 2 \overline{)25} \quad 12 \text{ R}1$$

$$4. 4 \overline{)63} \quad 15 \text{ R}3$$

$$5. 2 \overline{)36} \quad 18$$

$$6. 6 \overline{)77} \quad 12 \text{ R}5$$

Oral Practice

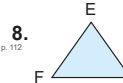
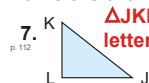
Dictation: Your teacher will dictate numbers for you to write.

Recitation: Say the divisibility rules for 2, 5, and 10 to your teacher.



We Remember

Name the triangles.



Δ EFG (Order of letters may vary.)

Copy the place value chart. Write each digit of each number in the correct column on the place value chart.

9. 6.7 p. 11

10. 0.2 p. 11

11. 9.1 p. 11

12. 3.3 p. 11

See chart at right.

	t	
9.	6	7
10.	0	2
11.	9	1
12.	3	3

Teaching the Lesson—Five Steps in Long Division

Review the four steps of division: divide, multiply, subtract, compare (page 72).

Display the steps in division poster. Explain and discuss the first four steps in long division. Divide, multiply, subtract, and compare. If the dividend still has a digit that hasn't been divided into, use the fifth step, **bring down**. Bring down the next digit and write it beside the subtraction answer. Start over with the divide step, using the new two-digit number made in Step 5 as the dividend. When the compare step is completed the second time, write the number compared as the remainder. Checking division with two-digit quotients may require setting up a multiplication problem instead of figuring mentally.

Write these division problems on the board.

Demonstrate using the five division steps to solve the first problem. Have students solve the remaining problems.

$$\begin{array}{r} 18 \\ 4 \overline{)72} \\ \underline{4} \\ 32 \\ \underline{32} \\ 0 \end{array}$$

$$\begin{array}{r} 28 \text{ R}2 \\ 3 \overline{)86} \\ \underline{6} \\ 26 \\ \underline{24} \\ 2 \end{array}$$

$$\begin{array}{r} 34 \text{ R}1 \\ 2 \overline{)69} \\ \underline{6} \\ 09 \\ \underline{8} \\ 1 \end{array}$$

Have students recite the 5 steps of division daily until every student can list them. Make sure they know how to work the steps as well as say the names of the steps.

Student Helps

Division Steps Mnemonic

Dad	Divide
Mom	Multiply
Sister	Subtract
Cousin	Compare
Brother	Bring down

Name the figures.

13. line
p. 40
AB or BA

14. ray
p. 40
DC

15. line segment
p. 40
EF or FE



Follow the directions.

16. Measure the yarn to the nearest inch.
p. 31
3 in



17. Measure the yarn to the nearest centimeter.
p. 32
7 cm

18. Write **twenty-four million, twenty-four thousand, twenty-four** using digits.
p. 109
24,024,024

19. Order from largest to smallest. **5.1 3.8 2.4 3.2**
p. 12
5.1 3.8 3.2 2.4

20. Measure the radius of the circle in Figure 3 in inches.
p. 52
1 in

21. Find the diameter of the circle in Figure 3 in inches.
p. 52
2 in

22. Write the first ten multiples of 6.
p. 28
6 12 18 24 30 36 42 48 54 60

23. Write **300,310,300** using words.
p. 109
three hundred million, three hundred ten thousand, three hundred

Estimate each answer. Show your work.

24. $45 + 23$
p. 31, 110
70

25. $42 - 16$
p. 31, 110
20

26. $315 + 278$
p. 31, 110
600

27. $872 - 460$
p. 31, 110
400

Write the answers.

28. 9 m = ____ mm
p. 24
9,000

29. 9 m = ____ cm
p. 24, 29
900

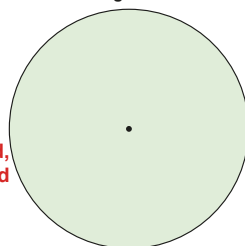
30. 14 m = ____ cm
p. 19, 24
1,400

31. 14 yd = ____ ft
p. 19
42

32. 12 gal = ____ qt
p. 19
48

33. In $\frac{8}{9}$ 9 is the ____ and 8 is the ____.
p. 5
denominator numerator

Figure 3



European moles dig many underground passages. They dig a bolt run passage as an exit in case of danger.



Oral Practice—Dictation

Follow the dictation procedure established on page 112.

Oral Practice—Recitation

Make sure the divisibility rules poster is not visible and call on students one at a time to recite the divisibility rules for 2, 5, and 10.

Divisibility Rules:

For 2—All even numbers are divisible by 2.

For 5—Numbers that end in 5 or 0 are divisible by 5.

For 10—Numbers that end in 0 are divisible by 10.

Speed Drill 11

$$1. \begin{array}{r} 18 \\ -9 \\ \hline 9 \end{array}$$

$$2. \begin{array}{r} 17 \\ -8 \\ \hline 9 \end{array}$$

$$3. \begin{array}{r} 16 \\ -7 \\ \hline 9 \end{array}$$

$$4. \begin{array}{r} 10 \\ -9 \\ \hline 1 \end{array}$$

$$5. \begin{array}{r} 14 \\ -9 \\ \hline 5 \end{array}$$

$$6. \begin{array}{r} 14 \\ -6 \\ \hline 8 \end{array}$$

$$7. \begin{array}{r} 13 \\ -9 \\ \hline 4 \end{array}$$

$$8. \begin{array}{r} 12 \\ -6 \\ \hline 6 \end{array}$$

$$9. \begin{array}{r} 8 \\ -2 \\ \hline 6 \end{array}$$

$$10. \begin{array}{r} 10 \\ -8 \\ \hline 2 \end{array}$$

$$11. \begin{array}{r} 13 \\ -5 \\ \hline 8 \end{array}$$

$$12. \begin{array}{r} 16 \\ -8 \\ \hline 8 \end{array}$$

$$13. \begin{array}{r} 11 \\ -7 \\ \hline 4 \end{array}$$

$$14. \begin{array}{r} 16 \\ -9 \\ \hline 7 \end{array}$$

$$15. \begin{array}{r} 10 \\ -2 \\ \hline 8 \end{array}$$

$$16. \begin{array}{r} 15 \\ -6 \\ \hline 9 \end{array}$$

$$17. \begin{array}{r} 5 \\ -4 \\ \hline 1 \end{array}$$

$$18. \begin{array}{r} 13 \\ -9 \\ \hline 4 \end{array}$$

$$19. \begin{array}{r} 13 \\ -7 \\ \hline 6 \end{array}$$

$$20. \begin{array}{r} 14 \\ -7 \\ \hline 7 \end{array}$$

$$21. \begin{array}{r} 7 \\ -4 \\ \hline 3 \end{array}$$

$$22. \begin{array}{r} 12 \\ -7 \\ \hline 5 \end{array}$$

$$23. \begin{array}{r} 9 \\ -6 \\ \hline 3 \end{array}$$

$$24. \begin{array}{r} 13 \\ -8 \\ \hline 5 \end{array}$$

$$25. \begin{array}{r} 12 \\ -3 \\ \hline 9 \end{array}$$

$$26. \begin{array}{r} 13 \\ -6 \\ \hline 7 \end{array}$$

$$27. \begin{array}{r} 11 \\ -3 \\ \hline 8 \end{array}$$

$$28. \begin{array}{r} 12 \\ -4 \\ \hline 8 \end{array}$$

$$29. \begin{array}{r} 11 \\ -8 \\ \hline 3 \end{array}$$

$$30. \begin{array}{r} 8 \\ -5 \\ \hline 3 \end{array}$$

$$31. \begin{array}{r} 6 \\ -2 \\ \hline 4 \end{array}$$

$$32. \begin{array}{r} 14 \\ -8 \\ \hline 6 \end{array}$$

$$33. \begin{array}{r} 15 \\ -7 \\ \hline 8 \end{array}$$

$$34. \begin{array}{r} 5 \\ -3 \\ \hline 2 \end{array}$$

$$35. \begin{array}{r} 17 \\ -9 \\ \hline 8 \end{array}$$

Solve the word problems.

34. Some places in Ireland have more rainy days than sunny days in a year. One leap year in County Kerry there were 209 rainy days. How many days did it not rain that year?

Think how many days are in a leap year.

157 days

35. Bridget's father dug 403 pounds of potatoes. He had planted 15 pounds in the spring. How much greater was the harvest than the planting?

388 pounds



Write the digit from 780,243,195 for each place value.

36. ten millions
p. 68 **8**

37. ones
p. 68 **5**

38. millions
p. 68 **0**

39. thousands
p. 68 **3**

40. ten thousands
p. 68 **4**

41. hundred millions
p. 68 **7**

Copy and solve.

$$42. \begin{array}{r} 3 \overline{)50} \\ 16 \text{ R } 2 \end{array}$$

$$43. \begin{array}{r} 2 \overline{)68} \\ 34 \end{array}$$

$$44. \begin{array}{r} 4 \overline{)99} \\ 24 \text{ R } 3 \end{array}$$



Sharpening Your Skills

Computation

Copy and solve.

$$45. \begin{array}{r} 75 \\ \times 15 \\ \hline 1,125 \end{array}$$

$$46. \begin{array}{r} 13 \\ \times 31 \\ \hline 403 \end{array}$$

$$47. \begin{array}{r} 5 \text{ R } 5 \\ 8 \overline{)45} \end{array}$$

$$48. \begin{array}{r} 5 \\ 7 \\ 2 \\ 3 \\ \hline 7 \end{array}$$

$$1,293$$

$$49. \begin{array}{r} 2,461 \\ + 6,205 \\ \hline 9,959 \end{array}$$

$$50. \begin{array}{r} 423 \\ \times 7 \\ \hline 2,961 \end{array}$$

$$51. \begin{array}{r} 362,785 \\ + 172,490 \\ \hline 535,275 \end{array}$$

$$52. \begin{array}{r} 313 \\ - 85 \\ \hline 228 \end{array}$$

Mental Math

Write the answers.

$$53. 8 \times 4 + 3 \quad \mathbf{35}$$

$$54. 300 - 200 \quad \mathbf{100}$$

$$55. \text{double } 23 \quad \mathbf{46}$$

$$56. \text{double } 16 \quad \mathbf{32}$$

Assign Class Work

Lesson Alert

Assign the lesson exercises for dividing with five steps on page 116.

Assign *We Remember* and *Sharpening Your Skills*.

Extra Practice

► Use the five steps to divide.

$$\begin{array}{r} 29 \text{ R } 2 \\ 3 \overline{)89} \\ \underline{6} \\ 29 \\ \underline{27} \\ 2 \end{array}$$

$$\begin{array}{r} 14 \text{ R } 4 \\ 5 \overline{)74} \\ \underline{5} \\ 24 \\ \underline{20} \\ 4 \end{array}$$

$$\begin{array}{r} 29 \\ 2 \overline{)58} \\ \underline{4} \\ 18 \\ \underline{18} \\ 0 \end{array}$$

$$\begin{array}{r} 12 \text{ R } 4 \\ 7 \overline{)88} \\ \underline{7} \\ 18 \\ \underline{14} \\ 4 \end{array}$$

$$\begin{array}{r} 13 \text{ R } 1 \\ 6 \overline{)79} \\ \underline{6} \\ 19 \\ \underline{18} \\ 1 \end{array}$$

$$\begin{array}{r} 12 \text{ R } 2 \\ 3 \overline{)38} \\ \underline{3} \\ 08 \\ \underline{6} \\ 2 \end{array}$$

Multiplying Two-Digit Numbers by Tens

Multiplying Two-Digit Numbers by Tens

There are two ways to multiply by numbers that have **zeros** in the ones place.

The long way

$$\begin{array}{r} 26 \\ \times 30 \\ \hline 00 \\ + 780 \\ \hline 780 \end{array}$$

A Shortcut for Multiplication

1 Write a zero in the ones place in the product.

$$\begin{array}{r} 26 \\ \times 30 \\ \hline 780 \end{array}$$

2 Multiply the nonzero digits.

Copy and solve. Use the shortcut.

$$\begin{array}{r} 43 \\ 1. \times 60 \\ \hline 2,580 \end{array}$$

$$\begin{array}{r} 59 \\ 2. \times 20 \\ \hline 1,180 \end{array}$$

$$\begin{array}{r} 82 \\ 3. \times 40 \\ \hline 3,280 \end{array}$$

$$\begin{array}{r} 36 \\ 4. \times 50 \\ \hline 1,800 \end{array}$$

Oral Practice

Read to your teacher: 400,100,200 5,601,003 26,000,020 206,301 8.93



We Remember

Copy and solve.

$$\begin{array}{r} 13 \\ 5. 4 \overline{)87} \end{array} \begin{array}{r} 13 \\ 6. 3 \overline{)39} \end{array} \begin{array}{r} 45 \\ 7. 2 \overline{)91} \end{array}$$

Write the digit sums.

$$\begin{array}{r} 8. 142 \\ 7 \end{array}$$

$$\begin{array}{r} 9. 59 \\ 5 \end{array}$$

$$\begin{array}{r} 10. 106 \\ 7 \end{array}$$

$$\begin{array}{r} 11. 456 \\ 6 \end{array}$$

Estimate each answer. Show your work.

$$\begin{array}{r} 12. \$85.50 + \$59.42 \\ \$145.00 \end{array}$$

$$\begin{array}{r} 13. \$76.94 - \$10.16 \\ \$67.00 \end{array}$$



It takes a worker bee 25,000 flights to and from the flowers to make one pound of honey.



Lesson 12

Pages 119-121

Materials Needed

Flash Cards: $\div 9$ and $\times 4$

Mastery Drill 12
for each student

Lesson Overview

Flash Card Drill

Mastery Drill

Mental Computations

$$25 \div 5 + 8 = 13$$

$$18 - 2 - 9 = 7$$

$$14 - 6 \div 2 = 4$$

$$5 \times 4 + 20 \div 3 = 43$$

Review

► Use the five steps to divide.

$$8 \overline{)94} \quad 11 \text{ R}6$$

$$4 \overline{)76} \quad 19$$

Teach

► *Multiplying Two-Digit Numbers by Tens*

Oral Practice

Assign

► *Lesson Exercises*
► *We Remember*
► *Sharpening Your Skills*

Teaching the Lesson—Multiplying Two-Digit Numbers by Tens

Review multiplying two digits by two digits (page 103). Explain and discuss two ways to multiply two two-digit numbers when one number is a multiple of ten. Using the shortcut saves time and paper space. When the second factor is a multiple of 10, the first product is all zeros. Adding these zeros to the second product does not change its value. The shortcut leaves out writing the zeros of the first partial product.

Read this word problem or write it on the board. Demonstrate the long way and the shortcut to solve the multiplication.

Devon's six dozen chickens laid 70 eggs each day in the month of August. How many eggs did they lay altogether?

$$\begin{array}{r} 31 \\ \times 70 \\ \hline 00 \\ 2,170 \\ \hline 2,170 \end{array}$$

Write these multiplication problems on the board. Have students use the shortcut to multiply.

$$\begin{array}{r} 74 \\ \times 50 \\ \hline 3,700 \end{array} \quad \begin{array}{r} 29 \\ \times 20 \\ \hline 580 \end{array} \quad \begin{array}{r} 35 \\ \times 40 \\ \hline 1,400 \end{array} \quad \begin{array}{r} 48 \\ \times 60 \\ \hline 2,880 \end{array}$$

Student Helps

Multiplication Shortcut

Some students may benefit by this setup for multiplication by multiples of 10. Move the multiple of 10 to the right, so zero is to the side. Multiply by the non-zero digit. Copy the zero down into the product.

$$\begin{array}{r} 74 \times 30 \\ 74 \\ \times 30 \\ \hline 2,220 \end{array}$$

This also works with multiples of 100 (and any other power of 10).

$$\begin{array}{r} 28 \times 500 \\ 28 \\ \times 500 \\ \hline 14,000 \end{array} \qquad \begin{array}{r} 39 \times 8,000 \\ 39 \\ \times 8,000 \\ \hline 312,000 \end{array}$$

Follow the directions.

14. Name the triangle in Figure 1.

$\triangle FIJ$ (Order of letters may vary.)

15. Write the first twelve multiples of 12.

12 24 36 48 60 72 84 96 108 120 132 144

16. Name the ray that intersects \overline{LM} .

\overrightarrow{TU}

17. Name the line that is parallel to \overleftrightarrow{PQ} .

\overleftrightarrow{KL} or \overleftrightarrow{LK}

18. Name the line segment that is perpendicular to \overleftrightarrow{KL} .

\overline{LM} or \overline{ML}

19. Write the fraction that equals one. $\frac{3}{5}$ $\frac{2}{3}$ $\frac{4}{4}$ $\frac{1}{8}$

$\frac{4}{4}$

20. Write the digit that is in the hundredths place. **2.81**

1

21. Write the digit that is in the tenths place. **2.81**

8

22. Write the proper fraction. $\frac{7}{8}$ $\frac{12}{12}$ $\frac{29}{24}$

$\frac{7}{8}$

23. Order from largest to smallest. $\frac{3}{9}$ $\frac{3}{4}$ $\frac{3}{6}$ $\frac{3}{8}$ $\frac{3}{3}$ $\frac{3}{5}$

$\frac{3}{3}$ $\frac{3}{4}$ $\frac{3}{6}$ $\frac{3}{8}$ $\frac{3}{9}$ $\frac{3}{5}$

Solve the word problems.

24. Sean and his friend Conan bicycled to the country to explore an old round tower. They had to use a ladder to get inside the tower because the door was 15 feet above the ground. How many yards from the ground was the door?

5 yd

25. The tower steps wound around and around. The inside of the tower was 21 meters tall. How many steps did Sean and Conan climb if every meter of height contained 4 steps?

84 steps

26. It took 0.75 of an hour to pedal up to the tower, 1.25 hours to explore and have lunch, and 0.50 of an hour to get back home. How much time did they spend in all?

2.50 hours

Figure 1

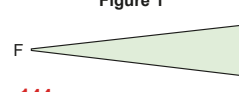
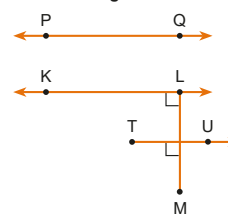


Figure 2



Teacher Notes

Write the numbers from the box.

27. quotient
p. 42
10

28. dividend
p. 42
50

29. 2 factors
p. 3
4 6

30. divisor
p. 42
5

31. product
p. 3
24

32. numerator
p. 5
3

33. denominator
p. 5
7

$$\frac{3}{7}$$

$$4 \times 6 = 24$$

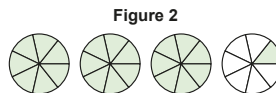
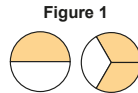
$$50 \div 5 = 10$$

Write the answers.

34. Write the fraction for the colored part of each shape in Figure 1. Write **<** or **>** to tell how the fractions compare.
 $\frac{1}{2} < \frac{2}{3}$

35. Write the fraction for the white part of each shape in Figure 1. Write **=** or **≠** to tell how they compare.
 $\frac{1}{2} \neq \frac{1}{3}$

36. Write both a mixed number and an improper fraction for Figure 2.
 $3\frac{1}{7}$ $\frac{22}{7}$



Copy and solve. Use the shortcut.

$$\begin{array}{r} 35 \\ 37. \times 30 \\ \hline 1,050 \end{array}$$

$$\begin{array}{r} 15 \\ 38. \times 50 \\ \hline 750 \end{array}$$



Sharpening Your Skills

Computation

$$\begin{array}{r} 12 \\ 39. \times 16 \\ \hline 192 \end{array}$$

$$\begin{array}{r} 43 \\ 43. \times 16 \\ \hline 688 \end{array}$$

Mental Math

47. $24 \times 1,000$
24,000

51. $890 \div 10$
89

55. $\frac{1}{4}$ of 20
5

Copy and solve.

$$\begin{array}{r} 427,195 \\ 40. - 84,006 \\ \hline 343,189 \end{array}$$

$$\begin{array}{r} 14 \\ 44. \times 37 \\ \hline 518 \end{array}$$

Write the answers.

48. 50×10
500

52. $20,400 \div 100$
204

56. $\frac{1}{8}$ of 40
5

$$\begin{array}{r} 2 \\ 41. + \frac{1}{7} \frac{3}{7} \\ \hline \end{array}$$

$$\begin{array}{r} 38 \\ 45. \times 6 \\ \hline 228 \end{array}$$

49. 17×100
1,700

53. $8 \times 6 + 3$
51

57. $\frac{1}{2}$ of 64
32

$$\begin{array}{r} 4.3 \\ 7.6 \\ 5.5 \\ 6.4 \\ 42. + 3.5 \\ \hline 27.3 \end{array}$$

$$\begin{array}{r} 71 \\ 46. \times 5 \\ \hline 355 \end{array}$$

50. $32,000 \div 1,000$
32

54. double 42
84

58. $\frac{1}{4}$ of 32
8

Lesson 12 – Multiplying Two-Digit Numbers by Tens

121

Speed Drill 12

- 1 yard = 36 inches
- 1 gallon = 4 quarts
- September has 30 days.
- February is month 2.
- July has 31 days.
- 1 pound = 16 ounces
- 1 ton = 2,000 pounds
- 1 dozen = 12 things
- 1 dollar = 100 cents
- A pentagon has 5 sides.
- February has 29 days in leap year.
- An octagon has 8 sides.
- December is month 12.
- 1 kilogram = 2,000 meters
- A triangle has 3 sides.
- June has 30 days.
- 1 liter = 1,000 milliliters
- 1 year = 12 months
- March is month 3.
- Leap year has 366 days.

Assign Class Work

Lesson Alert In Number 24 change the feet to yards. In Number 25 multiply the height of the tower by the number of steps in each meter.

Extra Practice

► Use the shortcut to multiply.

$$\begin{array}{r} 26 \\ \times 40 \\ \hline 1,040 \end{array}$$

$$\begin{array}{r} 42 \\ \times 50 \\ \hline 2,100 \end{array}$$

$$\begin{array}{r} 91 \\ \times 20 \\ \hline 1,820 \end{array}$$

$$\begin{array}{r} 86 \\ \times 30 \\ \hline 2,580 \end{array}$$

$$\begin{array}{r} 73 \\ \times 90 \\ \hline 6,570 \end{array}$$

$$\begin{array}{r} 58 \\ \times 40 \\ \hline 2,320 \end{array}$$

Assign the lesson exercises for using the shortcut to multiply on page 119.

Assign *We Remember* and *Sharpening Your Skills*.