The CHARLOTTE MASON ELEMENTARY ARITHMETIC SERIES

SAMPLE

Richele R. Baburina

BOOK 5

The Charlotte Mason Elementary Arithmetic Series

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by Richele Baburina

Special thanks to Alicia Behm for her help in writing additional sums.

The Charlotte Mason Elementary Arithmetic Series, Book 5
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"The Principality of *Mathematics* is a mountainous land, but the air is very fine and health-giving, though some people find it too rare for their breathing. It differs from most mountainous countries in this, that you cannot lose your way, and that every step taken is on firm ground. People who seek their work or play in this principality find themselves braced by effort and satisfied with truth."

(*Ourselves*, Book 1, p. 38)

Contents

Introduction

As your student journeys further up and further in the mountainous land of mathematics, it's good to remember the beauty and joy to be found along the way. Charlotte tells us that imagination and reason travel alongside intellect and, "By degrees, absolute truth unfolds itself. We are so made that truth, absolute and certain truth, is a perfect joy to us; and that is the joy that mathematics afford" (*Ourselves*, Book 1, p. 63). Irene Stephens, who headed up the studies in Science and Math for the House of Education, reminds us that Miss Mason "wanted the children to get a real sense of number; some vision of its innate power and beauty far beyond the sum of the moment. Miss Mason taught us that 'Education is the science of relations' and that a child should feel from the very beginning that his relations with number are opening up to him yet another realm of beautiful and wonderful things for his enjoyment and delight" (*The Parents' Review*, Vol. XL, "Number: A Figure and a Step Onward," 1929, p. 36).

In addition to education being the science of relations, Charlotte also held the view that education is an atmosphere, a discipline, and a life. Thus, a number of guiding principles and practices are found in these three educational keys. Some to bear in mind:

Atmosphere. Your good attitude toward math can help your student enjoy a healthy relationship with numbers while also maintaining a healthy relationship between you and your student. Avoid anxiety and conflict by never giving her the idea that she is somehow behind, that math is only for the gifted few or for those going into a STEM career, and by allowing your student the time she needs to wonder at and grapple with math.

Be sure to schedule Arithmetic at a time when your child is mentally fresh and then vary the subjects before and after to help keep her from tiring. Charlotte tells us, "If the lessons be judiciously alternated—sums first, say, while the brain is quite fresh; then writing, or reading—some more or less mechanical exercise, by way of a rest; and so on, the programme varying a little from day to day, but the same principle throughout—a 'thinking'

lesson first, and a 'painstaking' lesson to follow,—the child gets through his morning lessons without any sign of weariness *(Home Education,* p. 142). In Miss Mason's own schoolrooms, the schedule for this form began with a subject that involved listening and narrating, next came Arithmetic, to be followed by a mechanical lesson such as Dictation or Grammar.

Discipline. Charlotte Mason believed the good habits cultivated during math lessons gave the subject its rightful place in the curriculum and, over time, these habits would serve a person well throughout her life. Keep lessons short and engaging—they should never exceed 30 minutes with at least 5 of these minutes given to mental work in the form of rapid oral review. More can be accomplished when students are able to give their full attention to concentrated lessons rather than becoming accustomed to dawdling over long, drawn out ones. Allow your student the time needed for careful execution of written problems while the challenge of oral work will help develop fixed attention, concentration, and quick thinking.

A gridded math notebook also goes a long way in fostering habits of neatness and order. The size of grid chosen should be based on your student's writing so that one number can go inside each square, helping to keep everything in proper place value order and easy to read. As writing ability matures, a $\frac{1}{2}$" grid should give way to the standard $\frac{1}{4}$" grid. In the beginning stages of new notation—such as the fraction work found in this book—we start with simpler equations involving little work in order to first secure neatness and orderly arrangement.

Never allow sloppy work, give excessive explanations, or immediately help your child over each difficulty. Instead, allow her time to investigate, imagine, reason, and do the work herself. If she gets an answer wrong due to carelessness, a do-over will only reinforce the behavior. If a mistake is made because she doesn't understand the concept, then slow down and secure her understanding before giving a new problem.

Life. Charlotte recognized that mathematics, like music, is a living language that rings clearly with undeniable logic, and is able to feed a child's mind without the literary presentation she felt imperative in other subjects (*A Philosophy of Education*, pp. 333, 334).

In the early years, ideas were presented using common everyday objects. While concrete objects are used less in Book 5, they now give way to

the presentation of ideas by means of concrete examples. These examples, together with carefully graduated teaching, and engaging questions that spark the imagination and cultivate the child's power of reasoning, often allow the student to arrive at rules on her own—which you will notice is a focus of this book.

Arithmetic Concepts in Book 5

- Addition of decimals
- Subtraction of decimals
- Multiplication of decimals
- Division of decimals
- Dollars and cents
- Approximations
- Measurement by decimals
- Factors
- Measures of numbers
- Greatest Common Measure
- Numbers divisible by 2 through 12
- Prime numbers
- Greatest Common Factor
- Multiples of a number
- Least Common Multiple
- Fractions
- Improper fractions
- Simplifying fractions
- Addition of fractions
- Subtraction of fractions
- Addition & subtraction of mixed numbers
- Turning decimals into fractions
- Turning fractions into decimals
- Canceling

Overview of Lessons

In the previous book, the student had further practice in the four operations—working with numbers within 1,000,000. She learned to draw to scale, delved deeper into long multiplication and long division, and worked with averages and rounding. She also had more exact work with weights and measures in both the US standard system and the metric system—including measures of time, weight, distance, area, and cubic measure with an active hands-on approach. She continued work with fractions, handled more complex compound addition and subtraction, and was formally introduced to decimals.

In Book 5, the student will advance in her work with decimals and fractions, working with factors and both greatest and least common measures. Both US standard system and the metric system will occur using questions of a concrete nature throughout the book. She'll also continue her work with drawing to scale along with measures in decimals as well as fractions.

The arithmetic work for each week contains three important components: New, Review, and Mental Math too. New refers to work in the newest concept, Review is time given to maintain fluency in past concepts, while pencil and paper are put away for a stimulating time of Mental Math that helps build habits such as attention, speed, and accuracy. The daily lesson length is again 30 minutes per lesson, which includes 5 minutes of mental math. Note that many sections in the book may be used for oral work while additional mental math may be found at the back of the book. If your child is unable to give focused attention for this amount of time, work gradually to build her power of concentration. When her attention wanes, try switching to some lively mental math before returning to the main work of the lesson. Put the book away, though, if she is unable to concentrate following this change. This book is recommended for use with *Charlotte Mason Practical Geometry, Part I.* When used with *Practical Geometry,* four days should be given to arithmetic and one day to geometry. The recommended schedule is Monday through Thursday given to arithmetic lessons with Friday reserved for the hands-on geometry lesson, which is the traditional schedule followed by Charlotte's students.

Independent Work

While math is not considered an independent subject, you increasingly want your student to be able to do more and more work independently. As an aid in nurturing her ability to work alone, answers to some problems are placed in the back of the book. Here's the target balance to achieve:

- teacher and student work on initial concept and a number of problems together until comprehension and comfort is exhibited
- the student then works independently for a set amount of time
- the student then meets with teacher again to look over the accomplished work

Any Mixed Review and Review sections not specified as oral work may also be taken independently if the teacher ensures the student is working carefully and with understanding. It is not recommended to simply hand the book over to the student to work alone. Care should always be taken that reading and writing never overshadow the ideas of the math lesson, accuracy and understanding are maintained, and undesirable habits are not taking hold.

Assign a given amount of time to the child for independent work, while also allowing time to evaluate the work together in order to immediately address any misunderstandings. A lesson might look like:

- 5–10 minutes in new concept, student working first three exercises with you at her side
- 10–15 minutes of independent work
- 2–5 minutes looking over independent work
- 5 minutes mental math

and another like this:

- 2–5 minutes going over with student what is expected in the Review section, noting the amount of time allotted
- 10 minutes independent work of Review section
- 10 minutes work together in latest concept
- 5 minutes mental math

yet another like this:

- 15 minutes of work together in new section
- 5 minutes mental math
- 10 minutes continued work in new section

Notation and Writing

Understanding our system of notation is foundational to the idea of place value. When regrouping or exchanging occurs, i.e., borrowing and carrying, the student should say she is working with 4 ten thousands, 7 thousands, 5 hundreds, or 9 tens—not simply 4, 7, 5, or 9. The same is true when working with decimal numbers, with the student saying she is working with tenths, hundredths, thousandths, etc.

As your student's ease and ability in reading and writing increases, be sure she continues to maintain physical habits of neatness and order, even while working independently. The orderliness of each number contained in just one box on the grid of graph paper will help her maintain orderliness of thought. Alternating between written and mental work during the lesson will further nurture these habits.

Mental Arithmetic

The student will be expending mental effort throughout the lesson but there should also be a daily time given to work taken strictly orally, known as rapid oral work or mental math. Work noted to be given orally, Table Work, and additional review that is found throughout or in the back of the book are all fit for this activity. This type of work should be lively and engaging and is a good way to regain your child's responsiveness if you notice it is waning. Mental math may occur at the end of the lesson or another time during the day—indoors or out, with the student adding to the questions or multiple students posing mental work to each other. This type of mental arithmetic should always fall within the scope of a child's learning. If necessary, adjust to using lower numbers as she builds proficiency in this area.

If your child has yet to learn her math facts, or speed and fluency need to either be secured or maintained, spend at least 5 minutes

daily in this endeavor. The Number Sentence Cards found at simplycm.com/cmeas5-a are wonderful aids for mental math, solidifying math facts, as well as building speed and accuracy. If your child has never had the opportunity to make connections and investigate the logic of addition, subtraction, and multiplication tables, please refer to Books 2 & 3 in this series.

Review

While a student may have mastered or internalized a concept, review is still an important part of the weekly lessons and should not be skipped. Review acts as an aid in maintaining fluency while making gradual gains in speed and helps concepts and processes become second nature. Review of material covered in Book 4 as well as review of the new material have been built into this book, along with extra review of new concepts found in the back of the book. Review sections not specified as oral work may be taken independently as long as the teacher ensures the student is working carefully and with a good command of the material.

The target balance is:

- teacher and student look over the review section to ensure the student understands what is being asked of her,
- the student then works independently at her own pace for a set time,
- the student immediately meets with teacher to look over the accomplished work and address any concerns.

While a time of refreshing is normal after a long break, if your child has never worked with the concepts found in the initial review sections—or you believe she needs additional review—you will find completely guided lessons in the previous books in this series.

Tip: If you are continuing straight from Book 4 without a break, some of the initial review may be tiresome. If this is the case, explain to your student that you will go at her pace, which may be quite quick.

When to Advance

The number of problems necessary for a student to master or internalize a concept will vary with each individual child as well as the specific concept. You want the child to work with the newest process or idea until she is both comfortable and confident in her work but not so much that she becomes bored. Just as good habits must be reinforced over time, periodic review must also be given to solidify concepts and facts as well as build relative speed in using them. Math concepts often build upon each other so gaining fluency is vital. The importance of a strong foundation will become increasingly evident as the student meets with more complex math.

This book contains the components necessary to attain and maintain fluency through immediate work in the new material, ample review, and mental math—i.e., rapid oral work. Use of bookmarks or page markers can help you adapt and customize the lessons to fit the unique needs of your child. You are at liberty to not use every question at a given moment if they are found to be excessive or to give additional work found in the back if more work in a concept is necessary. Unused questions may be bookmarked and utilized for later review. If more work is found to be needed, the questions are written in such a way as to allow you to easily change numbers, names, and objects that relate to your own child's life and interests.

Familiarize yourself with each lesson by giving it a brief look-through ahead of time. This will allow you to gather any necessary materials in advance as well as help you maintain focus on your student during the lesson.

Practical Geometry

Charlotte Mason Practical Geometry is a weekly 30-minute lesson in which the student learns to handle mathematical tools, such as the compass and protractor, while gaining foundational ideas in geometry. This hands-on approach—spread over 2 years—develops a student's comfort with the mechanics of the tools, drawings, geometrical terms, and behavior of geometrical forms before formal geometry and proofs are ever introduced. In a Charlotte Mason education, Practical Geometry is traditionally taken

in tandem with Arithmetic, with one lesson now replacing one day of arithmetic during the week. The discoveries made during this time lend interest to the branch's formal study, while the physical habits gained in the mechanics of geometry allow the student to concentrate on ideas when formal geometry is begun.

For more information, see *Charlotte Mason Practical Geometry, Part I*. While the work in these books may be taken separately, it is recommended that *Charlotte Mason Practical Geometry, Part I* be taken along with this book and *Charlotte Mason Practical Geometry, Part II* be taken with Book 6 of The Charlotte Mason Elementary Arithmetic Series.

Pacing

While the concepts found in Book 5 generally take place in a child's fifth year of formal education, you should progress at a pace that ensures each step is taken on solid ground. Pace should be adjusted to the progress of the individual child rather than a standardized rate of learning or the pace of siblings and peers.

Aim for consistent and regular lessons and you should find the pace takes care of itself. Help instill a sense of confidence based on your student's own progress and achievements, remembering that communicating the idea that she is somehow behind can injure her confidence. The week's work should include work in the newest concept, review, and mental arithmetic. You may wish to bookmark certain pages to help distribute work in these three areas as best fits the needs of your student.

The charts given here are for your convenience as a loose planning guide. As always, adjust the chart to your child's pace rather than attempting to make your child fit the chart. The following is based on lessons that are 25 minutes in length with 5 minutes of mental arithmetic. If a child is unable to maintain attention for that length of time, simply make it a target goal to be gradually worked toward.

Term 1												
Suggested Weeks	1	2	3	4	5	6	7	8	9	10	11	12
Review of Previous Year's Work												
Addition, Subtraction, Division, Multiplication of Decimals												
Approximation & Rounding												
Measurement by Decimals												
Exam												

Term 2												
Suggested Weeks	13	14	15	16	17	18	19	20	21	22	23	24
Measures of Numbers												
Factors												
Numbers Divisible by 2 through 12												
Prime Numbers & Prime Factorization												
Greatest Common Factor												
Multiples of a Number												
Exam												

Term 3												
Suggested Weeks	25	26	27	28	29	30	31	32	33	34	35	36
Least Common Multiple												
Simplifying Fractions												
Improper Fractions												
Converting Decimals to Fractions & vice versa												
Addition & Subtraction of Fractions												
Addition & Subtraction of Mixed Numbers												
Canceling & Extra Written Review												
Exam												

Exams

Three end-of-term exams are provided in the back of this book. These are customizable to reflect where your child is in the lessons at the end of each term. See page 295 for details.

Supplies Needed

- Gridded math notebook
- Personal chalkboard, dry-erase board, or the like together with its appropriate writing instrument. For brevity, it will be referred to as *the slate* in the lessons.
- Four strips of paper of equal size—an 8.5" by 11" sheet of paper cut lengthwise into four equal strips will work
- Place value chart (visit simplycm.com/cmeas5-supplies for download and instructions)
- 12" ruler with US Standard and metric measures
- 36" length of string or fabric measuring tape
- Cardboard or heavy card stock at least 1" by 12"
- Drawing compass or circular object that can be traced, such as a small plate
- Meter stick
- Low-tack tape such as painter's tape, washi, or paper tape
- Analog clock

Optional

- The handbook, *Mathematics: An Instrument for Living Teaching*, contains a fuller explanation of Charlotte Mason's unique approach in mathematics, including the principles upon which the practices found in this book rest. Available from Simply Charlotte Mason.
- Number Sentence Cards. A collection of number sentence cards with over 1,000 ready-to-use equations at your fingertips. Valuable to have on hand so your student can keep working if your math lesson is unexpectedly interrupted or to use for five minutes of mental math to retain math facts, build speed, and promote accuracy and concentration. Available from Simply Charlotte Mason.

- Concrete objects, commonly called manipulatives, may no longer be necessary for a child this far along. Feel free to allow their use as needed as it will save time in the long run.
- Printed hundred chart from simplycm.com/cmeas5-supplies. Students will be guided to create a Sieve of Eratosthenes chart and a pre-printed hundred chart can be used to reduce writing.

Fractions Review

Objects used: 12-inch ruler with quarter-inch and eighth-inch marks and metric ruler. If the student has the ruler constructed in Book 4, this may be used.

By this time, your student will have had plenty of hands-on experience working with common fractions, as well as addition, subtraction, and conversion of fractions while using a standard ruler. She will know how to read and write proper, improper, and mixed fractions as well as solve simple equations involving their use. A short review of work taken in previous books in this series is covered here.

(to be given orally)

1. If you have 20 candies and give half of them away, how many have you given away? (10 candies)
2. Is $\frac{1}{2}$ of 20 the same as 20 ÷ 2? (yes)
3. How do you get $\frac{1}{2}$ of any number? (divide by 2)
4. If you shared $\frac{1}{4}$ of 20 candies, how many have you shared? (5 candies)
5. Is $\frac{1}{4}$ of 20 the same as 20 ÷ 4? (yes)
6. How many fourths are in a group of 20 candies? (4)
7. How do you find $\frac{1}{4}$ of any number? (divide it by 4)
8. 5 is what part of 20? ($\frac{1}{4}$)
9. If you divide a wooden board into five equal parts, what is each part called? ($\frac{1}{5}$)
10. What is one-fifth of: 20? 10? 25? 100? 15? 35? 60? (4, 2, 5, 20, 3, 7, 12)

11. If you divide a bowl of popcorn into three equal parts, what is each part called? ($\frac{1}{3}$)

12. What is one-third of 18? 9? 21? 6? 15? 30? 24? (6, 3, 7, 2, 5, 10, 8)

13. 9 is half of what number? (18)

14. What is one-fourth of: 24? 12? 48? 32? 60? 72? 36? (6, 3, 12, 8, 15, 18, 9)

15. 3 is what part of: 12? 6? 15? 9? ($\frac{1}{4}$, $\frac{1}{2}$, $\frac{1}{5}$, $\frac{1}{3}$)

16. 7 is one-fifth of what number? (35)

17. How many $\frac{1}{4}$ cups in 1 cup? (4 one-fourth cups) How many $\frac{1}{3}$ cups in 1 cup? (3 one-third cups) How many $\frac{1}{2}$ cups in 1 cup? (2 one-half cups)

18. What is one-eighth of: 16? 40? 32? 56? 24? 48? 80? (2, 5, 4, 7, 3, 6, 10)

19. If you cut 1 length of ribbon into thirds, how many pieces of ribbon would there be? (3 pieces)

20. How many quarters in a dollar? (4 quarters)

21. How many quarters in four dollars? (16 quarters)

22. Charlotte placed $\frac{1}{4}$ of 28 books on the shelf. How many books are on the shelf? (7 books)

23. What is $\frac{1}{4}$ of: 80? 44? 16? 36? 12? 28? 8? (20, 11, 4, 9, 3, 7, 2)

24. 5 is $\frac{1}{3}$ of what number? (15)

25. If you need to measure 1 cup of sugar but have only a $\frac{1}{3}$ measuring cup, what must you do? (Count out 3 measures, or fill the $\frac{1}{3}$ cup 3 times.)

Dictate the following while your student notates on either slate or paper:

1. One-third ($\frac{1}{3}$)
2. Three-fourths ($\frac{3}{4}$)
3. Nine and one-fifth ($9\ \frac{1}{5}$)
4. One-half ($\frac{1}{2}$)
5. Two-thirds ($\frac{2}{3}$)

Write the following fractions on a slate and have your student read them aloud:

1. $\frac{4}{5}$ (four-fifths)
2. $\frac{3}{8}$ (three-eighths)
3. $\frac{1}{4}$ (one-fourth or one-quarter)
4. $\frac{2}{4}$ (two-fourths or two-quarters)
5. $\frac{7}{8}$ (seven-eighths)

Using a standard ruler, have your student answer the following, being sure to give the unit of measure in her answer.

1. How many half-inches in 5"? (10 half-inches)
2. How many half-inches in half a foot? (12 half-inches)
3. Is $\frac{12}{2}$ the same as 6? (yes)
4. $3\ \frac{1}{2}" + 2" = ?$ ($5\ \frac{1}{2}"$)
5. $7\ \frac{1}{2}" + 4\ \frac{1}{2}" =$ (12" or 1')
6. How many quarter-inches in 1"? (4 quarter-inches)
7. How many quarter-inches in 2"? (8 quarter-inches)

8. Is $\frac{8}{4}$ the same as 2? (yes)
9. How many quarter-inches in $6\ \frac{1}{4}$"? (25 quarter-inches)
10. $3\ \frac{3}{4}$" + $5\ \frac{1}{4}$" = ? (9")
11. How many eighth-inches in 1 inch? (8 eighth-inches)
12. How many eighth-inches in 10 inches? (80 eighth-inches)
13. Is $\frac{80}{8}$ the same as 10? (yes)
14. 40 eighth-inches equals how many inches? (5 inches)
15. $1\ \frac{1}{8}$" + $\frac{6}{8}$" = ($1\ \frac{7}{8}$")

Convert quarter-inches and eighth-inches to inches.

1. 6 half-inches equals how many inches? (3 inches)
2. 20 quarter-inches equals how many inches? (5 inches)
3. If I ask you to divide 20 by 4, do you get the same answer as the previous question? (yes)
4. 24 eighth-inches equals how many inches? (3 inches)
5. If I ask you to divide 24 by 8, do you get the same answer as the previous question? (yes)

Allowing your student to look at the metric ruler, ask the following:

1. What part of a centimeter is 1 millimeter? (one-tenth)
2. How many millimeters in $1\ \frac{1}{2}$ centimeters? (15 mm)
3. How many millimeters in $\frac{3}{10}$ of a centimeter? (3 mm)
4. $2\ \frac{7}{10}$ cm equals how many millimeters? (27 mm)
5. $\frac{3}{10}$ cm + $\frac{7}{10}$ cm = how many centimeters? (1 cm)

Fractions and Ideas of Fractions

(instructions to the parent)

This section introduces and works with the terminology of fractions while underscoring two ideas: fractions as a division of a quantity and fractions as parts of a whole. These ideas will lead the student to the idea of decimals representing fractional parts. She has already had hands-on experience as well as written work with fractions, our decimalized monetary system, and decimals and their numeration and notation. More work with fractions will be dealt with in greater depth later in the book.

1. Explain: You have met a few ideas of fractions in your previous studies. One idea is that a fraction expresses division of a quantity. For example, 2 chocolate bars are to be shared equally among 3 friends. No one will receive a whole bar, so we must divide the 2 bars into 3 equal pieces.

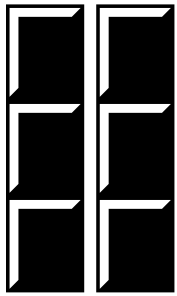
   Write on the slate: $2 \div 3$

2. Say: This is also expressed as a fraction.

   Write on the slate using a horizontal fraction bar: $\frac{2}{3}$

   Point out that 2 represents the chocolate bars, the fraction bar represents division, and the 3 represents the friends.

2	chocolate bars		dividend
—		÷	
3	friends		divisor



   Here's another example: If 8 friends share 1 pizza equally, we have

1 pizza divided into 8 equal slices, which can be expressed as the fraction 1 over 8:

Write on slate using a horizontal fraction bar: $\frac{1}{8}$

3. Say: This fraction shows 1 pizza is divided by 8, that is, 1 ÷ 8. In this way, fractions can be used to represent any division problem. The fraction line is seen as another symbol for division, with the number on top as the dividend and the bottom number as the divisor.

1	pizza	dividend
—		÷
8	friends	divisor

Explain: You have also seen the idea of fractions as parts of a whole. For example, if a person eats 1 slice of the 8 slices of pizza, the one slice is shown in relationship to the part, or portion, of the whole pizza that those 8 slices represent. This is expressed as $\frac{1}{8}$.

If someone ate 3 slices of the pizza, it is expressed as $\frac{3}{8}$.

Write on the slate: $\frac{3}{8}$

In this way, fractions can record any quantity as a part, or portion, of a whole.

4. Write on the slate: $\frac{1}{4}$

Explain: If you were baking cookies and measured $\frac{1}{4}$ cup of chocolate chips, this measurement shows a quantity that relates to a whole cup.

Ask: If you filled the $\frac{1}{4}$ cup 2 more times, what quantity of chocolate chips have you? ($\frac{3}{4}$ cup)

5. Write on the slate: $\frac{3}{4}$ *c.*

Ask: How many $\frac{1}{4}$ cup measures are in a cup? (4 measures)

6. Say: So, you see how a fraction represents a fractional part—that is—an equal part of a whole. In this case, it is one whole cup.

   Continue: $\frac{1}{2}$ of a foot clearly shows us how the part relates to a whole foot. $\frac{3}{16}$ of a pan of brownies could be eaten if the pan were divided into 16 portions.

   We could print 45 pages of a document, but the document could be 50, 75, 101, 299, or 407 pages long. The fractions $\frac{45}{75}$, $\frac{45}{101}$, or $\frac{45}{407}$ give us a much clearer picture of what part of the whole document has been printed.

   Likewise, an acre of land could be divided into 6 plots, 7 plots, 9 plots, or 12 plots.

   $\frac{5}{6}$ of the plots could have been sold, $\frac{2}{7}$ of the plots might be sold, or $\frac{4}{9}$, or $\frac{1}{12}$, giving us a clear understanding of the parts of the whole.

7. Ask the student to name any 10 fractions.

8. Now, introduce some fraction terminology, saying: The bottom number in a fraction is called the *denominator* and tells the number of parts into which the whole is divided, or how many parts are in the whole. The top number is called the *numerator* and numbers how many parts of the whole we are considering.

9. Write on the slate: $\frac{3}{8}$

   Write *numerator* next to the 3 and *denominator* next to the 8.

   Say: The terms *numerator* and *denominator* are used to describe the parts of a fraction.

10. Ask your student to write $\frac{5}{7}$ in her notebook and write the terms next to each number.

$$\begin{array}{r} 0.0 \\ 2\overline{)0.16} \end{array}$$

There are no tenths in the answer so we must write a zero in the tenths place of the quotient before moving to the hundredths place

$$\begin{array}{r} 0.08 \\ 2\overline{)0.16} \\ -\ 0.16 \\ \hline 0 \end{array}$$

16 hundredths

Answer: 0.08 m

Explain: Since the answer should be given as hundredths of a meter, we must be careful not to write or say 0.8 m, but 0.08 m. Remember that there must be a digit in each decimal place of the quotient, so we must be careful to put a zero as a placeholder for each of the places after the decimal point into which the divisor will not go.

3. Ask: When dividing 0.024 by 8, can you tell what place value name your answer will have? (thousandths)

   How many zeros will there be to the right of the decimal point before the first non-zero digit? (2 zeros)

Tip: If your student is unable to answer the previous two questions after some thought, simply move on to the written work of the problem as her solution will provide the answers.

$$\begin{array}{r} . \\ 8\overline{)0.024} \end{array}$$

Place a decimal point in the quotient over the decimal point in the dividend, then divide.

$$\begin{array}{r} 0.00 \\ 8\overline{)0.024} \end{array}$$

There are no units, tenths, or hundredths in the quotient so write zeros in those places before moving to the thousandths place.

$$\begin{array}{r} 0.003 \\ 8\overline{)0.024} \\ -\ 0.024 \\ \hline 0 \end{array}$$

24 thousandths

Answer: 0.003

Exercises

(to be completed in the math notebook)

The following may be assigned as independent written work if the student is working with accuracy and understanding. She should be sure to label any units of measure.

1. 4.2 cm ÷ 6
2. 57.96 ft. ÷ 9
3. 7.35 ÷ 7
4. 106.59 ÷ 51
5. Jennifer bottled 20.24 gallons of lavender oil. She evenly filled 44 bottles. What part of a gallon were in each bottle?
6. Daniel rode his bicycle 76.2 kilometers in 3 hours. How many kilometers did he average an hour?
7. Divide 0.125 by 5.
8. Divide the answer to #1 by 5.
9. Divide 2.466 by 6.
10. Divide the answer to #3 by 3.

Answers are on page 306.

Adding Zeros Without Changing the Value

(instructions to the parent)

1. Say and show: You'll recall that when we write 2 dollars, we often write it as $2.00 to show there are no fractional parts of the dollar, that is, we have 2 dollars and no tenths or hundredths of a dollar. Having only zeros after the decimal point does not change its value in any way, just as having zeros after the final non-zero number after the decimal point does not change any number's value.

2. Ask your student to write the following dollar amounts on her slate, showing there are no fractional parts:

   seven dollars (*$7.00*)

   three dollars (*$3.00*)

   nine dollars (*$9.00*)

   four dollars (*$4.00*)

   eleven dollars (*$11.00*)

3. Say: In the same way, if we have a whole number such as 4, and we want to divide it by a larger number, such as 5, we could write 4.0 or 4.00 without changing its value.

Tip: If this process is unclear, imaginary money may be thought of to understand how this works. The dollar bills will have to be changed to 40 dimes, with each person receiving 8 dimes, or $0.80. Remind your student that placing a 0 after a decimal or after the final non-zero digit does not change its value. If the process is still unclear, get out real or play money.

```
  0.          0.          0.8
5)4.0       5)4.0       5)4.0
- 0         - 0.↓       - 0.↓
              4           4.0
                        - 4.0
                            0
```

4. Have your student work 2 ÷ 5 on the slate.

```
  0.          0.          0.4
5)2.0       5)2.0       5)2.0
- 0         - 0.↓       - 0.↓
              2           2.0
                        - 2.0
                            0
```

5. Read each problem aloud, having your student restate the dividend as a whole number and a decimal—with a zero in the tenths place—and solve mentally:

Tip: If the student is unable to solve these mentally, she may use written work in her notebook.

2 ÷ 4? (2.0 ÷ 4 = 0.5)

3 ÷ 6? (3.0 ÷ 6 = 0.5)

4 ÷ 8? (4.0 ÷ 8 = 0.5)

5 ÷10? (5.0 ÷ 10 = 0.5)

1 ÷ 2? (1.0 ÷ 2 = 0.5)

1 ÷ 5? (1.0 ÷ 5 = 0.2)

8 ÷ 10? (8.0 ÷ 10 = 0.8)

3 ÷ 5? (3.0 ÷ 5 = 0.6)

6. Have your student write the following on the place value chart in a column and read the decimals aloud:

0.1 (1 tenth)

0.10 (10 hundredths)

Round down to the nearest half-hour. (3:00)

Let's take another time of 9:56 and round each way (to be written on the slate as above):

Round to the nearest quarter-hour. (10:00)

Rounded up to the nearest quarter-hour. (10:00)

Round down to the nearest quarter-hour. (9:45)

Round to the nearest half-hour. (10:00)

Round up to the nearest half-hour. (10:00)

Round down to the nearest half-hour. (9:30)

Exercises

(to be given orally)

1. Round to the nearest half-hour:

   6:11 (6:00) 7:35 (7:30) 12:05 (12:00) 8:48 (9:00)

2. Round up to the nearest half-hour:

   6:11 (6:30) 7:35 (8:00) 12:05 (12:30) 8:48 (9:00)

3. Round down to the nearest half-hour:

   6:11 (6:00) 7:35 (7:30) 12:05 (12:00) 8:48 (8:30)

4. Round to the nearest quarter-hour:

   6:11 (6:15) 7:35 (7:30) 12:05 (12:00) 8:48 (8:45)

5. Round up to the nearest quarter-hour:

6:11 (6:15) 7:35 (7:45) 12:05 (12:15) 8:48 (9:00)

6. Round down to the nearest quarter-hour:

6:11 (6:00) 7:35 (7:30) 12:05 (12:00) 8:48 (8:45)

Exercises

(to be worked in the math notebook)

The following may be assigned as independent work, with your student working as many as she is able in a given amount of time. In the next lesson, pick up wherever she left off.

Round each of the following first to the nearest hour, then round to the nearest half-hour, and then to the nearest quarter-hour:

1. 5:12 11:24 2:53 9:39
2. 4:08 10:44 1:17 12:32
3. 7:28 5:10 8:45 6:31

Answers are on page 310.

Mixed Review

(to be worked in the math notebook)

1. Write the following numbers in Roman numerals:

   12 20 57 110 1,116

2. 672×53
3. $48\overline{)9840}$

4. How many cubic meters is a block of marble that is 2 meters long, 2 meters wide, and 4 meters high?

5. Jolene made a pan of brownies that is 2 inches thick, 9 inches wide, and 12 inches long. How many cubic inches is that?

Answers are on page 310.

Measurement by Decimals

(instructions to the parent)

Objects used: ruler with metric measures and homemade ruler in tenths of inches, 3" × 5" index card, fabric measuring tape or string, geometry compass or object with which to trace a circle

Note: Over the next few lessons, students will be exploring geometry principles such as area, circumference, diameter, pi, etc. The focus of these exercises will be on the arithmetic required to work with these ideas. Further exploration of the geometrical reasoning behind these concepts appears beginning in Charlotte Mason Practical Geometry, Part I *and are expanded upon in later books in the geometry series.*

Following is hands-on work in measurement with decimals that also exercises the student's reasoning powers through ideas that will later be found in geometry. The formation of good habits in both the processes of arithmetic and accuracy in taking measurements, drawing, and notation should be ensured. The student should always work with measurements she takes herself—though they may vary slightly with those given here. All work and answers should be notated in the math notebook.

1. Say: Measure the length and width of the front page of this book in centimeters, rounding to the nearest tenth. If you are using an electronic version of this book, choose any book page to measure.

Tip: Give your student plenty of time to see if she can arrive at the process on her own and tell you the steps she is taking.

$2\frac{1}{4} = 1\frac{4}{4} + \frac{1}{4} = 1\frac{5}{4}$ — After changing a whole to fractional form, we must add the fractions in the minuend together before we are able to take from them.

$2 - 1 = 1$ — Subtract whole numbers.

$\frac{5}{4} - \frac{3}{4} = \frac{2}{4}$ — Subtract fractions, simplifying as necessary.

$1\frac{1}{2}$ hours

Have your student solve the following on her slate, letting you know how she worked each problem. The steps are provided for the first.

$8\frac{1}{3} - 3\frac{2}{3} =$

$8\frac{1}{3} = 7\frac{3}{3} + \frac{1}{3} = 7\frac{4}{3}$ — After changing a whole number to fractional form, add the fractions together before subtracting from them.

$7 - 3 = 4$ — Subtract whole numbers.

$\frac{4}{3} - \frac{2}{3} = \frac{2}{3}$ — Subtract fractions, reducing as necessary.

$4\frac{2}{3}$

$9\frac{1}{6} - 2\frac{5}{6} =$ $(6\frac{2}{6} = 6\frac{1}{3})$

$5\frac{3}{8} - 4\frac{7}{8} =$ $(\frac{4}{8} = \frac{1}{2})$

3. Have your student solve the following in her math notebook, either circling or placing a box around her final answer. Be sure she keeps her work as neat and ordered as possible.

   Explain: Just as with addition of mixed numbers, subtraction problems may be solved by converting the mixed numbers to improper fractions then converting the answer back to a mixed number.

   Solve the following by converting to improper fractions, subtracting, and converting the answer back to a mixed number. After you've found the solution, check each answer immediately by working the problem again using the first method. Then you can decide which method is most convenient.

Tip: The first subtraction sum has the steps shown for your convenience.

$3\frac{2}{8} - 1\frac{7}{8} =$

$3\frac{2}{8} - 1\frac{7}{8} = \frac{26}{8} - \frac{15}{8}$	Convert both mixed numbers to improper fractions.
$\frac{26}{8} - \frac{15}{8} = \frac{11}{8}$	Subtract the improper fractions.
$\frac{11}{8} = 1\frac{3}{8}$	Change the improper fraction back to a mixed number, reducing as necessary.

Check the answer using the first method:

$3\frac{2}{8} = 2\frac{8}{8} + \frac{2}{8} = 2\frac{10}{8}$	After changing one whole number to fractional form, add the fractions together before subtracting from them.
$2 - 1 = 1$	Subtract whole numbers.

$\frac{10}{8} - \frac{7}{8} = \frac{3}{8}$ Subtract fractions, reducing as necessary.

$1\frac{3}{8}$

Exercises

(to be worked in math notebook)

If your student is able to work the first three exercises with understanding, she may be assigned the remaining problems as independent work.

1. $5\frac{5}{12} - 4\frac{7}{12} =$
2. $6\frac{3}{5} - 2\frac{4}{5} =$
3. $8\frac{1}{6} - 3\frac{5}{6} =$
4. $9\frac{2}{7} - 5\frac{5}{7} =$
5. $5\frac{9}{13} - 4\frac{7}{13} =$
6. $27\frac{5}{13} - 9\frac{7}{13} =$
7. $2\frac{1}{3} - 1\frac{2}{3} =$
8. $7\frac{2}{21} - 4\frac{7}{21} =$
9. $17\frac{3}{9} - 6\frac{7}{9} =$
10. $12\frac{3}{13} - 9\frac{5}{13} =$

Answers

1. $5\frac{5}{12} - 4\frac{7}{12} = 4\frac{17}{12} - 4\frac{7}{12} = \frac{10}{12} = \frac{5}{6}$ OR $5\frac{5}{12} - 4\frac{7}{12} = \frac{65}{12} - \frac{55}{12} = \frac{10}{12} = \frac{5}{6}$
2. $6\frac{3}{5} - 2\frac{4}{5} = 5\frac{8}{5} - 2\frac{4}{5} = 3\frac{4}{5}$ OR $6\frac{3}{5} - 2\frac{4}{5} = \frac{33}{5} - \frac{14}{5} = \frac{19}{5} = 3\frac{4}{5}$
3. $8\frac{1}{6} - 3\frac{5}{6} = 7\frac{7}{6} - 3\frac{5}{6} = 4\frac{2}{6} = 4\frac{1}{3}$ OR $8\frac{1}{6} - 3\frac{5}{6} = \frac{49}{6} - \frac{23}{6} = \frac{26}{6} = 4\frac{2}{6} = 4\frac{1}{3}$

Answers 4–10 are on page 336.

Subtraction of Fractions Review – Mixed Numbers

(to be worked in the math notebook)

The following may be assigned as independent work with the student solving by her preferred method. She should work as many as she is able in a given amount of time, then pick up where she left off in the next lesson.

1. $1\frac{1}{10} - \frac{3}{10} =$
2. $2\frac{1}{4} - 1\frac{3}{4}$
3. $9\frac{3}{16} - 7\frac{9}{16} =$
4. $97\frac{4}{19} - 18\frac{12}{19} =$
5. $7\frac{2}{17} - 4\frac{6}{17} =$
6. $27\frac{4}{25} - 13\frac{12}{25} =$
7. $33\frac{1}{12} - 26\frac{5}{12} =$
8. $5\frac{2}{33} - 2\frac{5}{33} =$
9. $77\frac{1}{7} - 66\frac{3}{7} =$
10. $4\frac{1}{9} - 1\frac{4}{9} =$

Answers are on page 337.

Exercises

(to be given orally)

Simplify the following fractions by reducing to lowest terms:

$\frac{6}{12}$ $(\frac{1}{2})$ $\frac{10}{15}$ $(\frac{2}{3})$ $\frac{6}{8}$ $(\frac{3}{4})$ $\frac{5}{25}$ $(\frac{1}{5})$ $\frac{14}{16}$ $(\frac{7}{8})$ $\frac{3}{12}$ $(\frac{1}{4})$ $\frac{3}{9}$ $(\frac{1}{3})$

$\frac{8}{12}$ $(\frac{2}{3})$ $\frac{7}{14}$ $(\frac{1}{2})$ $\frac{8}{24}$ $(\frac{1}{3})$

Change the following fractions:

$\frac{3}{4}$ to twelfths $(\frac{9}{12})$

$\frac{5}{8}$ to sixteenths $(\frac{10}{16})$

$\frac{1}{3}$ to sixths $(\frac{2}{6})$

$\frac{2}{5}$ to tenths $(\frac{4}{10})$

$\frac{2}{3}$ to twelfths $(\frac{8}{12})$

$\frac{5}{6}$ to eighteenths $(\frac{15}{18})$

$\frac{3}{4}$ to eighths ($\frac{6}{8}$)

$\frac{1}{2}$ to tenths ($\frac{5}{10}$)

$\frac{3}{5}$ to fifteenths ($\frac{9}{15}$)

$\frac{2}{3}$ to twenty-fourths ($\frac{16}{24}$)

Ask: When multiplying the terms of a fraction by the same number, does its value change? (no)

Mixed Review

(to be given orally)

1. There are 12 weeks in a term of school. How many weeks in 3 terms? (36 weeks)
2. How many inches in 20 feet? (240")
3. If there are 33 lines on a page and 11 words per line, how many words on a page? (363 words)
4. How many days in 72 hours? (3 days)
5. If 12 notebooks cost 84 dollars, how much do 2 notebooks cost? ($14)
6. Abram had $1.00, and spent 25 cents for a gum ball and 45 cents for a sticker. How much money had he left? (30 cents)
7. It cost Jared $38 in materials to build a bookshelf that he sold for $75. How much did Jared earn? ($37)
8. The sum of three numbers is 50. If one number is 14 and another number is 22, what is the third number? (14)
9. The age of three cousins is 14, 16, and 18 years. What is their average age? (16 years)
10. Which is worth more, $3 or 10 quarters? ($3)

11. How many minutes are in $\frac{2}{3}$ of an hour? (40 minutes)
12. How many minutes in $\frac{3}{4}$ of an hour? (45 minutes)
13. How many minutes in $\frac{4}{5}$ of an hour? (48 minutes)
14. How many minutes in $\frac{5}{6}$ of an hour? (50 minutes)
15. Lake Wautaga is 260 ft. deep. Pike Lake is $\frac{1}{4}$ as deep as Lake Wautaga. How deep is Pike Lake? (65 ft.)

Addition and Subtraction of Mixed Numbers with Different Denominators Review

(to be worked in the math notebook)

These may be assigned as independent work if your student displays understanding with the first two problems. She should work for an assigned amount of time and carry on where she left off in the next lesson.

Tip: It may or may not be necessary to write out every step in the solution to a problem. Just be sure the written work is expansive enough that the student can use it to explain her line of thinking in obtaining the answer.

Solve the following using either method of adding and subtracting mixed numbers. Choose five to check immediately by solving again with the alternate method.

1. If Jo is $15\frac{3}{4}$ years old, and Amy is $12\frac{5}{6}$ years old, what is the difference between their ages?
2. Meg is $16\frac{1}{6}$ years old and Beth is $13\frac{7}{8}$ years old. What is their difference in age?
3. Laurie is carrying a parcel that weighs $5\frac{7}{16}$ lb. and a parcel that weighs $3\frac{1}{2}$ lb. How much is he carrying in all?

4. During free time, Emily spends $3\frac{2}{5}$ hours in the garden and $2\frac{2}{3}$ hours writing poetry. How much free time did Emily have in all?

5. Find the sum of $5\frac{8}{9}$ and $3\frac{1}{4}$.

6. $7\frac{1}{8} + 4\frac{3}{10}$

7. What is the difference between $8\frac{3}{4}$ and $6\frac{4}{11}$?

8. $9\frac{3}{8} - 3\frac{2}{5}$ 9. $8\frac{2}{3} - 5\frac{3}{4}$ 10. $6\frac{2}{9} + 7\frac{5}{6}$

Answers

1. $15\frac{3}{4} - 12\frac{5}{6} = 15\frac{9}{12} - 12\frac{10}{12} = 14\frac{21}{12} - 12\frac{10}{12} = 2\frac{11}{12}$ years, or 2 years, 11 months
2. $16\frac{1}{6} - 13\frac{7}{8} = 16\frac{4}{24} - 13\frac{21}{24} = 15\frac{28}{24} - 13\frac{21}{24} = 2\frac{7}{24}$ yr.

Answers 3–10 are on page 337.

Mixed Review

The following may be taken as independent written work. The student should ensure all units of measure are written with the answers.

What is the cost of:

1. 486 books at $15 each?
2. 204 bookmarks at $3 apiece?
3. 99 bookshelves at $75 each?
4. 34 book lights at $9 each?
5. 160 book covers at $20 apiece?

Change

6. 351 feet to yards.
7. 3,000 seconds to minutes.

8. 546 days to weeks.

9. 4,320 hours to days.

10. 448 ounces to pounds.

Answers are on page 338.

Canceling

(instructions to the parent)

Your student has previously divided both terms of a fraction with the GCF in order to reduce a fraction to lowest terms. She has also learned that simplifying fractions to lower terms does not change the value of the fraction. Now she will be shown a new way to reduce fractions called canceling. Be sure to have her give answers herself whenever possible.

1. Explain with use of a slate. You learned that when reducing fractions to lower terms by dividing both terms by the same number, the value of the fraction remains the same. For example, dividing both terms of $\frac{6}{8}$ by 2 gives $\frac{3}{4}$ and is written thus:

$$\begin{array}{ccccc} 6 & \div & 2 & = & 3 \\ \hline 8 & \div & 2 & = & 4 \end{array}$$

Say. We can also reduce $\frac{6}{8}$ to $\frac{3}{4}$ using a method called canceling.

Step 1: Think by which number both terms are evenly divisible.

(Both 6 and 8 are evenly divisible by 2.)

Step 2: Mentally divide the numerator by this number. Then cancel by crossing out the numerator and writing the reduced numerator above it.

Think 6 ÷ 2 = (3)

$\frac{6}{8}^{3}$

Step 3: Mentally divide the denominator by the same number. Cancel by crossing out the denominator and writing the reduced denominator below it.

Think 8 ÷ 2 = (4)

$\frac{6}{8}^{3}_{4}$

Step 4: Write the answer.

$\frac{6}{8}^{3}_{4} = \frac{3}{4}$

2. Have your student reduce the following fractions to lowest terms, using the method of cancellation:

$\frac{6}{18}$ $(\frac{1}{3})$ $\frac{15}{20}$ $(\frac{3}{4})$ $\frac{4}{10}$ $(\frac{2}{5})$ $\frac{8}{12}$ $(\frac{2}{3})$ $\frac{9}{27}$ $(\frac{1}{3})$

Exercises

(to be worked in the math notebook)

Your student may take the following as independent work if she has worked the above with understanding.

Reduce the following fractions to lowest terms by canceling:

1. $\frac{8}{10}$ 2. $\frac{14}{35}$ 3. $\frac{3}{15}$ 4. $\frac{9}{24}$ 5. $\frac{15}{27}$

6. $\frac{5}{10}$ 7. $\frac{6}{15}$ 8. $\frac{10}{25}$ 9. $\frac{9}{12}$ 10. $\frac{8}{18}$

Answers are on page 338.

Canceling Large Fractions

(instructions to the parent)

1. State: When reducing a large fraction to lowest terms, you previously found the GCF. You may also use canceling more than once as another method to simplify a large fraction.

   For example, let's use the steps in canceling to reduce $\frac{48}{72}$.

   Step 1: Think by which number both terms are obviously evenly divisible. (Both 48 and 72 are evenly divisible by 6.)

   Step 2: Mentally divide the numerator by this number. Then cancel by crossing out the numerator and writing the reduced numerator above it.

   Think 48 ÷ 6 = (8)

   $\frac{\cancel{48}\,8}{72}$

   Step 3: Mentally divide the denominator by the same number. Cancel by crossing out the denominator and writing the reduced denominator below it.

   Think 72 ÷ 6 = (12)

   $\frac{\cancel{48}\,8}{\cancel{72}\,12}$

   This lowers the terms of the fraction, but it still isn't in lowest terms.

   Step 4: Reduce to lowest terms by canceling again. Continue canceling until the fraction is in lowest terms.

   $\frac{\cancel{8}\,2}{\cancel{12}\,3}$ Think 8 ÷ 4. Cancel 8 and write 2.

   Think 12 ÷ 4. Cancel 12 and write 3.

Step 5: Write the answer.

$\frac{48}{72} = \frac{2}{3}$

2. Reduce the following fractions to lowest terms by canceling as many times as necessary.

   Have your student reduce the following fractions to lowest terms, using the method of cancellation:

   $\frac{45}{60}$ $(\frac{3}{4})$ $\frac{30}{45}$ $(\frac{2}{3})$ $\frac{18}{54}$ $(\frac{1}{3})$ $\frac{49}{70}$ $(\frac{7}{10})$ $\frac{18}{108}$ $(\frac{1}{6})$

Exercises

(to be worked in math notebook)

Your student may take the following as independent work if she has worked the above with understanding. Have her work as many as able in a given amount of time, picking up where she left off in the next lesson.

Simplify the following fractions by canceling as many times as necessary to reduce them to lowest terms:

1. $\frac{32}{80}$ 2. $\frac{12}{48}$ 3. $\frac{48}{102}$ 4. $\frac{45}{105}$ 5. $\frac{56}{360}$

6. $\frac{108}{135}$ 7. $\frac{64}{100}$ 8. $\frac{48}{120}$ 9. $\frac{30}{54}$ 10. $\frac{168}{320}$

Answers are on page 338.

Baking Using Fractions

Congratulations on completing Book 5! This special recipe is to celebrate your job well done. It first appeared in the children's section of *The Parent's Review*—a monthly magazine edited by Charlotte Mason and Emeline

Steinthal. Though the recipe has Christmas in the name, these tiny cakes are perfect anytime. They are so delicious, you will probably want to use your math skills to immediately double the recipe!

Christmas Chocolate Buns

Note: The original recipe by Helena Steinthal has been adapted for a contemporary audience. Caster sugar (sometimes spelled castor) is also called super fine sugar. It is ground a bit finer than our granulated sugar but not nearly as fine as powdered sugar. If caster sugar/super fine sugar is not carried at your local grocery, it may be made by pulsing the sugar in a food processor or blender for 2 to 3 pulses.

Ingredients

$\frac{3}{4}$ c. caster sugar

$\frac{1}{2}$ c. unsalted butter at room temperature

$\frac{1}{2}$ c. flour

$\frac{1}{2}$ c. chocolate chips, melted

3 eggs, separated

Powdered sugar for dusting

Preheat oven to 350°.

Butter a 12-cup muffin pan and set aside.

Directions

1. Cream together the butter and sugar, add the melted chocolate chips (cooled slightly so the eggs don't scramble) and egg yolks, and stir until blended, then fold in the flour.
2. In a separate bowl, beat the egg whites to a froth—this can take longer than expected, even with a mixer. Little bubbles should appear throughout and the color will change slightly, but soft peaks will not yet form. When frothed, add to the mixture and fold in carefully to combine.
3. Divide batter evenly between the cups, filling them just under half full.
4. Bake about 15–20 minutes until a toothpick inserted into the center comes out clean.
5. Remove from pan and allow to cool completely on wire rack.
6. Dust with powdered sugar and enjoy!

Mental Math — Rapid Oral Work

The goal of this 5-minute time of rapid oral work is to increase accuracy and speed while building habits such as attention and promptness. The questions are written in such a way as to be easily expanded by fitting in different numbers. The student(s) should be invited to come up with their own mental math problems to pose to you or to one another as well.

Another great way to provide more mental math is by using the Number Sentence Cards. These sets of clearly printed Number Sentence Cards offer more than 1,000 ready-to-use equations that help the student build or retain speed and accuracy with the math facts. The cards are sold separately