
Math Mammoth Fractions 1

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Introduction

Math Mammoth Fractions 1 is the first book of two that covers all aspects of fraction arithmetic. This book covers the concepts of fraction and mixed numbers, equivalent fractions, adding and subtracting like and unlike fractions, adding and subtracting mixed numbers, and comparing fractions. The book *Fractions 2* covers simplifying fractions and multiplication and division of fractions.

I have made a set of videos to match many of the lessons in this book. You can access them at http://www.mathmammoth.com/videos/fractions_1.php

Studying fractions involves lots of rules, and many students learn them only mechanically, not really understanding the underlying concepts and principles. Then they end up making lots of mistakes because they confuse the different rules and either apply the wrong one or apply the right rule but don't remember it quite right. All this can make students even fear fractions in math.

To avoid that, this book uses the visual model of a pie divided into slices all the way through the book. It is a very natural model, because it uses a circle that can be divided into any number of circle sectors (slices). When students work with this model from lesson to lesson, they will eventually be able to “see” these pies in their mind. This, in turn, gives them the ability to do many of the easier fraction calculations mentally. It also enables students to really UNDERSTAND these concepts, and not just learn mechanical rules.

You are welcome to use manipulatives alongside the book; however the visual pie model is probably sufficient for most students in 5th grade level. I have also included (in the appendix) printable cutouts for fractions from halves to twelfths. You can use them to make your own fraction manipulatives.

To make the manipulatives sturdier, glue the printed pages on cardboard, and cut the parts only after gluing. The whole circle is there to illustrate “one whole” - needed when studying mixed numbers. You will probably need to print at least two copies of each cutout page. You can use the white cutout fractions if you need to save on ink and let children color them. Just use consistent colors so that thirds are always the same color, fourths are the same color, etc.

In the first lesson, *Fraction Terminology* explains the various parts of a fraction as well as what the different types of fractions are known as. The student can refer back to this information as needed as he does the lessons in this book.

The lesson *Review: Mixed Numbers* needs to be thoroughly understood before progressing further.

The next lessons, cover adding and subtracting mixed numbers and are well illustrated with “pies” to help the student visualize the concept of regrouping fractions so they can complete the math.

Then, it is time to study equivalent fractions, as a prerequisite for adding unlike fractions. Equivalent fractions are presented as parts that have been split further. The rule is to multiply both the numerator and the denominator by the same number, but try to emphasize the terminology of “splitting the existing parts into so-and-so many pieces” or something similar. That should help students to understand the concept instead of memorizing a mechanical rule.

Adding and Subtracting Unlike Fractions is an introductory lesson in the sense that the student is not yet introduced to the rule for finding the common denominator. In this lesson, the common denominator is either given, or the student figures it out using pictures.

Finding the (Least) Common Denominator emphasizes the idea that we need to find a common denominator, and then convert the fractions to like fractions before adding.

Next we study *Adding and Subtracting Mixed Numbers* with unlike fractional parts. We have some word problems in this lesson to utilize the concept of converting unlike fractions to like fractions.

Then we cover the concept of comparing fractions. Once the student has mastered converting two fractions to equivalent, like fractions, this should be fairly easy.

The last lesson in the book, *Measuring in Inches*, uses pictures to illustrate measuring with inches and fractions of inches. This lesson gives the student a chance to see how fractions can become useful in measuring items in every day life as it also have some word problems to solve using fractions.

Answers are in the end of the book.

I wish you success in your math teaching!

Maria Miller, the author

Helpful Resources on the Internet

Use these free online resources to supplement the “bookwork” as you see fit.

Fraction Videos for Math Mammoth Fractions 1 book

A set of videos by the author that tie in with the lessons in this book.

http://www.mathmammoth.com/videos/fractions_1.php

Fractions and Mixed Numbers

Clara Fraction's Ice Cream Shop

A game in which you convert improper fractions to mixed numbers and scoop the right amount of ice cream flavors on the cone.

www.mrnussbaum.com/icecream/index.html

Equivalent Fractions

Equivalent Fractions from National Library of Virtual Manipulatives (NLVM)

See the equivalency of two fractions as the applet divides the whole into more pieces.

http://nlvm.usu.edu/en/nav/frames_asid_105_g_2_t_1.html

Equivalent Fractions

Draw two other, equivalent fractions to the given fraction. Choose either square or circle for the shape.

<http://illuminations.nctm.org/ActivityDetail.aspx?ID=80>

Fraction Frenzy

Click on pairs of equivalent fractions, as fast as you can. See how many levels you can get!

www.learningplanet.com/sam/ff/index.asp

Fresh Baked Fractions

Practice equivalent fractions by clicking on a fraction that is not equal to others.

www.funbrain.com/fract/index.html

Addition and Subtraction

MathSplat

Click on the right answer to addition problems (like fractions) or the bug splats on your windshield!

<http://fen.com/studentactivities/MathSplat/mathsplat.htm>

Adding fractions

Illustrates how to find the common denominator when adding two unlike fractions using interactive pie models.

http://nlvm.usu.edu/en/nav/frames_asid_106_g_3_t_1.html

Old Egyptian Fractions

Puzzles to solve: add fractions like a true Old Egyptian Math Cat!

www.mathcats.com/explore/oldegyptianfractions.html

Fraction Bars Blackjack

Computer deals you two fraction cards. You have the option of getting more or “holding”. The object is to get as close as possible to 2, without going over, by adding the fractions on your cards.

http://fractionbars.com/Fraction_Bars_Black_Jack/

Action Fraction

A racing game with several levels where you answer questions about adding and subtraction fractions. The levels advance from using like fractions to using unlike fractions and eventually subtraction.

http://funschool.kaboose.com/formula-fusion/number-fun/games/game_action_fraction.html

Fishy Fractions

Select the correct answer and the pelican catches the fish. Options for fraction addition or subtraction, like or unlike denominators, simplifying, comparing, and more.

www.iknowthat.com/com/L3?Area=FractionGame

Comparing Fractions

Comparison Shoot Out

Choose level 2 or 3 to compare fractions and shoot the soccer ball to the goal.

www.fuelthebrain.com/Game/play.php?ID=47

Order Fractions

On each round, you drag five given fractions in the correct order.

<http://www.bbc.co.uk/schools/ks2bitesize/maths/activities/fractions.shtml>

Comparing Fractions - XP Math

Simple timed practice with comparing two fractions.

<http://xpmath.com/forums/arcade.php?do=play&gameid=8>

Fractional Hi Lo

Computer has selected a fraction. You make guesses and it tells you if your guess was too high or too low.

www.theproblemsite.com/games/hilo.asp

All Aspects

Visual Fractions

Great site for studying all aspects of fractions: identifying, renaming, comparing, addition, subtraction, multiplication, division. Each topic is illustrated by either a number line or a circle with a Java applet.

Also couple of games, for example: make cookies for Grampy.

www.visualfractions.com

Sample worksheet from

www.mathmammoth.com

Conceptua Math

Conceptua Math has free, interactive fraction tools and activities that are very well made. The activities include identifying fractions, adding and subtracting, estimating, finding common denominators and more. Each activity uses several fraction models such as fraction circles, horizontal and vertical bars, number lines, etc. that allow students to develop conceptual understanding of fractions.

www.conceptuamath.com

Who Wants Pizza?

Explains the concept of fraction, addition and multiplication with a pizza example, then has some interactive exercises.

<http://math.rice.edu/~lanius/fractions/index.html>

Fraction lessons at MathExpression.com

Tutorials, examples, and videos explaining all the basic fraction math topics. Look for the lesson links in the left sidebar.

www.mathexpression.com/understanding-fractions.html

Visual Math Learning

Free tutorials with some interactivity about all the fraction operations. Emphasizes visual models and lets student interact with those.

www.visualmathlearning.com/pre_algebra/chapter_9/chap_9.html

Fractioncity

Make “fraction streets” and help kids with comparing fractions, equivalent fractions, addition of fractions of like and unlike denominators while they drive toy cars on the streets. This is not an online activity but has instructions of how to do it at home or at school.

www.teachnet.com/lesson/math/fractioncity.html

Online Fraction Calculator

Add, subtract, multiply or divide fractions and mixed numbers.

www.homeschoolmath.net/worksheets/fraction_calculator.php

Fraction Worksheets: Addition, Subtraction, Multiplication, and Division

Create custom-made worksheets for the four operations with fractions and mixed numbers.

www.homeschoolmath.net/worksheets/fraction.php

Fraction Worksheets: Equivalent Fractions, Simplifying, Convert to Mixed Numbers

Create custom-made worksheets for some other fraction operations.

www.homeschoolmath.net/worksheets/fraction-b.php

Free worksheets for order of operations

Generate printable & customizable worksheets for order of operations. Choose from five operations and parentheses. You can choose the number range used, number of problems, and more.

http://www.homeschoolmath.net/worksheets/order_of_operations.php

My Dear Aunt Sally

A fun game you can play online for free, or purchase as an app. Choose whole numbers, integers, fractions, decimals, or rational numbers, and then which of the five operations to use. In the game, you need to place the given numbers into two expressions so that the operations make the two expressions have the same value.

<http://www.mydearauntsally.com>