

math

MAMMOTH

Grade 3-B Worktext

Place value with thousands

Geometry

Measuring

Division

Fractions



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Foreword

Math Mammoth Grade 3-A and Grade 3-B worktexts comprise a complete math curriculum for third grade mathematics studies that meets and exceeds the Common Core standards.

Third grade is a time for learning and mastering two (mostly new) operations: multiplication and division within 100. The student also deepens his understanding of addition and subtraction, and uses those in many different contexts, such as with money, time, and geometry.

The main areas of study in Math Mammoth Grade 3 are:

1. Students develop an understanding of multiplication and division of whole numbers through problems involving equal-sized groups, arrays, and area models. They learn the relationship between multiplication and division, and solve many word problems involving multiplication and division (chapters 2, 3, and 9).
2. Students develop an understanding of fractions, beginning with unit fractions. They use fractions along with visual fraction models and on a number line. They also compare fractions by using visual fraction models and strategies based on noticing equal numerators or denominators (chapter 10).
3. Students learn the concepts of area and perimeter. They relate area to multiplication and to addition, recognize perimeter as a linear measure (in contrast with area), and solve problems involving area and perimeter (chapter 7).
4. Students fluently add and subtract within 1,000, both mentally and in columns (with regrouping). They learn to add and subtract 4-digit numbers, and use addition and subtraction in problem solving (chapters 1 and 6).

Additional topics we study are time (chapter 4), money (chapter 5), measuring (chapter 8), and bar graphs and picture graphs (in various chapters).

This book, 3-B, covers place value and 4-digit numbers (chapter 6), geometry (chapter 7), measuring (chapter 8), division (chapter 9), and fractions (chapter 10). The rest of the topics are covered in the 3-A student worktext.

When you use these two books as your only or main mathematics curriculum, they are like a “framework,” but you still have a lot of liberty in planning your child's studies. While multiplication and division chapters are best studied in the order they are presented, feel free to go through the geometry, clock, measuring, and fraction sections in a different order. For geometry chapter, the child should already know the multiplication tables.

This might even be advisable if your child is “stuck” on some concept, or is getting bored. Sometimes the brain “mulls it over” in the background, and the concept he/she was stuck on can become clear after a break.

Math Mammoth aims to concentrate on a few major topics at a time, and study them in depth. This is totally opposite to the continually spiraling step-by-step curricula, in which each lesson typically is about a different topic from the previous or next lesson, and includes a lot of review problems from past topics.

This does not mean that your child would not need occasional review. However, when each major topic is presented in its own chapter, this gives you more freedom to plan the course of study *and* choose the review times yourself. In fact, I totally encourage you to plan your mathematics school year as a set of certain topics, instead of a certain book or certain pages from a book.

For review, the download version includes an html page called `Make_extra_worksheets_grade3.htm` that you can use to make additional worksheets for computation or for number charts. You can also simply reprint some already studied pages.

I wish you success in your math teaching!

Maria Miller, the author

Chapter 6: Place Value with Thousands

Introduction

This chapter covers 4-digit numbers (numbers with thousands), and adding and subtracting them. We also study rounding and estimating, which are very important skills for everyday life.

First, students learn place value—breaking 4-digit numbers into their parts (thousands, hundreds, tens, and ones), and comparing. Next, they practice some mental addition and subtraction with 4-digit numbers. The lesson stresses the similarities between adding and subtracting 4-digit numbers and adding and subtracting smaller numbers. This helps build number sense. We also study regrouping in addition and subtraction.

The last major topics in this chapter are rounding numbers to the nearest hundred and estimating. Students also do some problem solving in one lesson.

The Lessons	page	span
Thousands	8	<i>4 pages</i>
Four-Digit Numbers and Place Value	12	<i>4 pages</i>
Which Number is Greater?	16	<i>2 pages</i>
Mental Adding and Subtracting	18	<i>4 pages</i>
Add 4-Digit Numbers with Regrouping	22	<i>2 pages</i>
Subtract 4-Digit Numbers with Regrouping	24	<i>4 pages</i>
Rounding to the Nearest Hundred	28	<i>3 pages</i>
Estimating	31	<i>3 pages</i>
Word Problems	34	<i>3 pages</i>
Mixed Review	37	<i>2 pages</i>
Review	39	<i>2 pages</i>

Helpful Resources on the Internet

Base Ten Blocks

Interactive base ten blocks for illustrating numbers up to 10,000. You can also solve problems.

<http://www.hoodamath.com/mobile/games/basetenblocks.html>

Cookie Dough

Practice either spelling big numbers, or writing the numbers from the words.

<http://www.funbrain.com/cgi-bin/nw.cgi?A1=s&A2=10000&A3=1&A12=0>

<http://www.funbrain.com/cgi-bin/nw.cgi?A1=s&A2=10000&A3=1&A12=1>

Number Forms – Lesson and exercises

Learn how to express numbers in standard, expanded and word form in this online number forms game.

<http://www.turtlediary.com/game/number-forms-standard-expanded-or-word-form.html>

Sample worksheet from
www.mathmammoth.com

Crossword Puzzle – Place Value

<http://www.free-training-tutorial.com/word-games/crossword-puzzles-place-value-4.html>

Number Detective

Decode clues given at the bottom screen to find out the numbers. The levels advance in difficulty.

<http://www.turtlediary.com/game/number-detective.html>

Place value puzzler

Place value or rounding game. Choose “easy” place value or “easy” rounding for this level.

<http://www.funbrain.com/tens/index.html>

Balloon Pop Math – Order Numbers

Pop the balloons in order from the smallest number to the largest. Choose the number range 1-10,000.

<http://www.sheppardsoftware.com/mathgames/placevalue/BPOrder1000.htm>

Caterpillar Slider

First, set the max number as high as possible. Then, place the “number leaves” in order on the branch.

http://www.ictgames.com/caterpillar_slider.html

ADDITION AND SUBTRACTION

Place Value Splat

Click on the amounts of hundreds, tens, and ones that equal the given number. Think of regrouping!

<http://www.sheppardsoftware.com/mathgames/placevalue/PlaceValuesShapesShoot.htm>

Drag and Drop Math – choose subtraction

Practice 4-digit addition or subtraction in columns in this customizable activity.

<http://mrnussbaum.com/drag-and-drop-math/>

Mental Addition and Subtraction Quiz

<http://www.thatquiz.org/tq-1/?-j14g03-l1i-p0>

Four-Digit Addition and Subtraction Quizzes

<http://www.thatquiz.org/tq-1/?-jg41-l34-p0>

<http://www.thatquiz.org/tq-1/?-jg42-l34-p0>

ROUNDING AND ESTIMATING

Rounding Sharks

Click on the shark that has the number rounded correctly.

<http://www.free-training-tutorial.com/rounding/sharks.html>

Interactive Rounding Crossword

<http://www.free-training-tutorial.com/word-games/crossword-puzzles-rounding-100.html>

Maximum Capacity - Estimation

Drag as many gorillas as you can into the elevator without exceeding the weight capacity of the elevator.

<http://www.mrnussbaum.com/maximumcapacity.htm>

Estimation Game

Estimate the answers by clicking on the number line. Choose “Add 100s” or “Subtract 100s”.

<http://www.mathsisfun.com/numbers/estimation-game.php>

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Four-Digit Numbers and Place Value

Here the numbers 2467, 1090, and 5602 are written as a *sum* of their different place values.

It is like writing each part of the number out in full: the thousands, the hundreds, the tens, and the ones. **Notice the zeros!** When there are *no* hundreds, or tens, or ones, we write a zero.

thou- sands	hund- reds	tens	ones
2	4	6	7
2000 + 400 + 60 + 7			

thou- sands	hund- reds	tens	ones
1	0	9	0
1000 + 0 + 90 + 0			

thou- sands	hund- reds	tens	ones
5	6	0	2
5000 + 600 + 0 + 2			

1. Fill in the blanks, and write the numbers as a sum of the different place values.

a. 1,034 = ___ thousand ___ hundreds ___ tens ___ ones
 = 1000 + 0 + 30 + 4

b. 5,670 = ___ thousand ___ hundreds ___ tens ___ ones
 = 5000 + _____ + _____ + _____

c. 3,508 = ___ thousand ___ hundreds ___ tens ___ ones
 = _____ + _____ + _____ + _____

d. 8,389 = ___ thousand ___ hundreds ___ tens ___ ones
 = _____ + _____ + _____ + _____

e. 9,007 = ___ thousand ___ hundreds ___ tens ___ ones
 = _____ + _____ + _____ + _____

f. 7,214 = ___ thousand ___ hundreds ___ tens ___ ones
 = _____ + _____ + _____ + _____

2. Fill in the table.

<p>a. five thousand nine hundred ninety</p> <p>T H T O</p> <table border="1"> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </table>					<p>b. Six thousand sixteen</p> <p>T H T O</p> <table border="1"> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </table>					<p>c. Six thousand three hundred three</p> <p>T H T O</p> <table border="1"> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </table>								
<p>d. Eight thousand seven hundred</p> <p>T H T O</p> <table border="1"> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </table>					<p>e. Nine thousand two hundred forty-five</p> <p>T H T O</p> <table border="1"> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </table>					<p>f. Ten thousand</p> <p>ten thou- sands</p> <table border="1"> <tr> <td>T</td> <td>H</td> <td>T</td> <td>O</td> </tr> <tr> <td>1</td> <td>0</td> <td>0</td> <td>0</td> </tr> </table>	T	H	T	O	1	0	0	0
T	H	T	O															
1	0	0	0															

3. These numbers are written as sums. Write them in the normal way.

<p>a. $2000 + 90 =$ _____</p> <p>$3000 + 200 =$ _____</p>	<p>b. $8000 + 5 =$ _____</p> <p>$1000 + 80 + 7 =$ _____</p>
<p>c. $8000 + 200 + 20 =$ _____</p> <p>$2000 + 500 + 90 + 8 =$ _____</p>	<p>d. $4000 + 50 =$ _____</p> <p>$2000 + 800 + 7 =$ _____</p>

4. What part of these numbers is missing?

a. $5000 + 80 +$ _____ $= 5,083$	b. $7000 +$ _____ $+ 5 = 7,605$
c. _____ $+ 3000 = 3,050$	d. _____ $+ 700 + 1 = 2,701$

5. Write the numbers immediately after and before the given number.

- a.** _____ 6,049 _____ **b.** _____ 2,324 _____
- c.** _____ 1,800 _____ **d.** _____ 8,809 _____
- e.** _____ 7,385 _____ **f.** _____ 9,244 _____

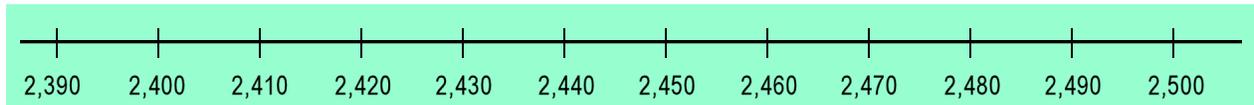
6. These numbers are written as sums, but in a scrambled order! Write them as normal numbers.

a. $4000 + 900 + 7 =$ _____	b. $80 + 500 + 8000 + 6 =$ _____
c. 2 thousand 7 ones 4 tens	d. 2 tens 6 hundred 4 thousand
e. 7 thousand 8 hundred 8 ones	f. 5 thousand 6 tens
g. 3 thousand 4 ones	h. 5 hundred 9 thousand

7. What part of these numbers is missing?

a. $900 + 2 +$ _____ $= 8,902$	b. $5000 + 40 +$ _____ $= 5,046$
c. _____ $+ 6000 + 40 = 6,540$	d. _____ $+ 4000 + 300 = 4,340$

8. Here is a number line from 2,390 to 2,500 with tick-marks for every 10.

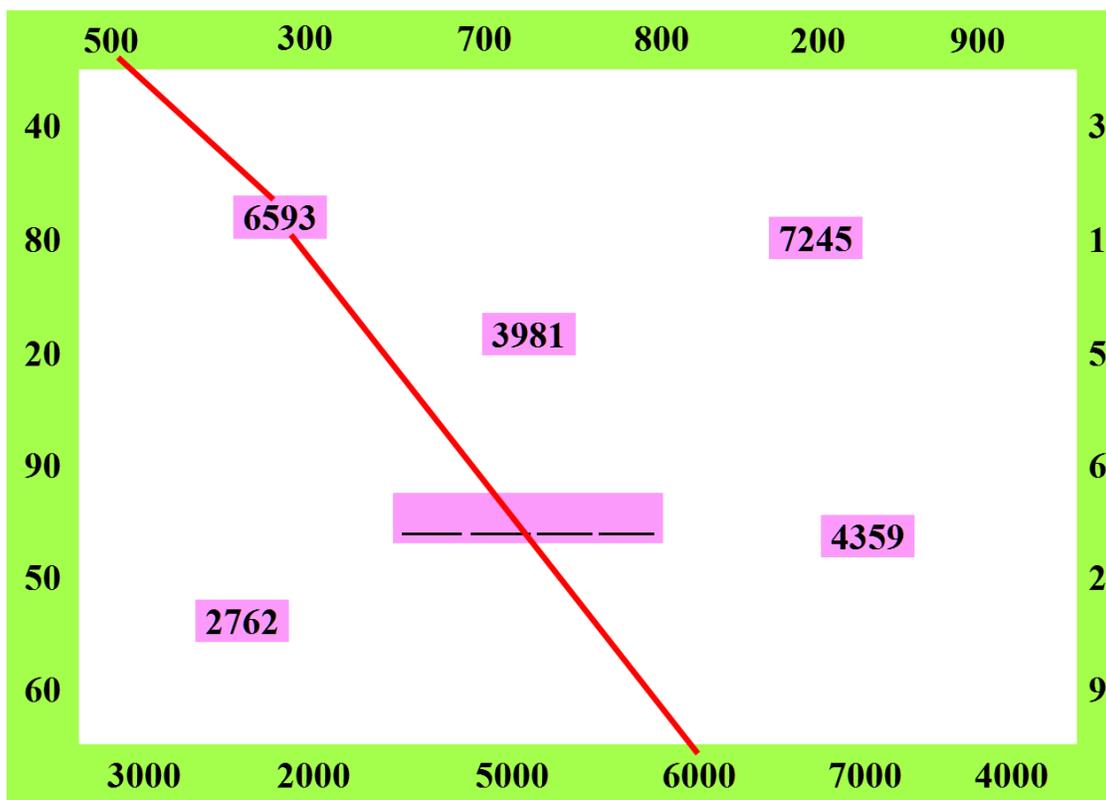


Mark these numbers on the number line (approximately):
2415 2398 2441 2476 2483 2499

9. Draw a number line from 7,650 to 7,750 with tick marks at every 10.

Mark these numbers on the number line (approximately):
7659 7672 7745 7717 7688

10. Connect each number inside the puzzle to its whole thousands, hundreds, tens, and ones that it contains. For example, 6,593 is connected to 6,000 and to 500 (for starters). Add the unused numbers from the border to form the missing number inside.



11. Solve the puzzle. Think of breaking the numbers into thousands, hundreds, tens, and ones.

	+		+		+		=	5206
+		+		+		+		
	+		+		+		=	3078
+		+		+		+		
	+		+		+		=	1925
+		+		+		+		
	+		+		+		=	432
=		=		=		=		
5022		3235		1408		976		

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Chapter 7: Geometry

Introduction

The seventh chapter of *Math Mammoth Grade 3* deals with geometry. The emphasis is on two new concepts: area and perimeter.

First, we study and review shapes in one lesson where the student divides shapes into new ones, and also encounters some tilings (a.k.a. tessellations). Next, we study in more detail about some quadrilaterals, namely squares, rectangles, and rhombi (plural of rhombus).

Then comes the focus of this chapter: perimeter and area. Students find perimeters of polygons, including finding the perimeter when the side lengths are given, and finding an unknown side length when the perimeter is given.

They learn about area, and how to measure it in square inches, square feet, square centimeters, square meters, or just square units if no unit of length is specified.

Students also relate area to the operations of multiplication and addition. They learn to find the area of a rectangle by multiplying the side lengths, and to find the area of rectilinear figures by dividing them into rectangles and adding the areas.

We also study the distributive property “in disguise.” This means using an area model to represent $a \times (b + c)$ as being equal to $a \times b$ plus $a \times c$. The expression $a \times (b + c)$ is the area of a rectangle with side lengths a and $(b + c)$, which is equal to the areas of two rectangles, one with sides a and b , and the other with sides a and c .

Multiplying by Whole Tens is a lesson about multiplication such as 3×40 or 90×7 . It is put here so that students can then use their multiplication skills to calculate areas of bigger rectangles.

Then we solve many area and perimeter problems. That is necessary so that students learn to distinguish between these two concepts. They also get to see rectangles with the same perimeter and different areas or with the same area and different perimeters.

Lastly, we touch on solids, such as cubes, rectangular prisms, pyramids, cones, and cylinders, and study their faces, edges, and vertices. You can make paper models for them from the printouts provided in the curriculum. Alternatively, you can buy them, usually made in plastic. Search on the internet for “geometric solids.”

The Lessons

	page	span
Shapes	46	4 pages
Some Special Quadrilaterals	50	3 pages
Perimeter	53	3 pages
Problems with Perimeter	56	3 pages
Getting Started with Area	59	2 pages
More About Area	60	4 pages
Multiplying by Whole Tens	65	4 pages
Area Units and Problems	69	4 pages
Area and Perimeter Problems	73	2 pages
More Area and Perimeter Problems	75	3 pages
Solids	78	2 pages
Mixed Review	80	2 pages
Geometry Review	82	2 pages

Helpful Resources on the Internet

Use these online resources as you see fit to supplement the main text.

SHAPES

Shapes Splat

Get points by clicking on the correct shapes.

http://www.sheppardsoftware.com/mathgames/earlymath/shapes_shoot.htm

Shapes Identification Quiz from ThatQuiz.org

An online quiz in a multiple-choice format, asking to identify common two-dimensional shapes. You can modify the quiz parameters to your liking.

www.thatquiz.org/tq-f/math/shapes/

Quadrilateral Shapes Shoot

Practice identifying quadrilaterals. You can choose relaxed or fast mode.

<http://www.sheppardsoftware.com/mathgames/geometry/shapeshoot/QuadShapesShoot.htm>

Classifying Quadrilaterals Game

Identify and choose the correct shape to help Jojo the monkey collect the bananas.

<http://www.turtlediary.com/game/classifying-quadrilaterals.html>

Interactive Quadrilaterals

Drag the corners to play with squares, rectangles, rhombi, and more.

<http://www.mathsisfun.com/geometry/quadrilaterals-interactive.html>

Polygon Playground

Drag various colorful polygons to the work area to make your own creations!

<http://www.mathcats.com/explore/polygons.html>

Shape Cutter

Draw any shape (polygon), cut it, and manipulate the cut pieces. You can have the computer mix them up, and then try to recreate the original shape.

<http://illuminations.nctm.org/ActivityDetail.aspx?ID=72>

Patch Tool

An online activity where the student designs a pattern using geometric shapes.

<http://illuminations.nctm.org/ActivityDetail.aspx?ID=27>

Tangram puzzles for kids

Use the seven pieces of the Tangram to form the given puzzle. Complete the puzzle by moving and rotating the seven shapes.

<http://www.abcya.com/tangrams.htm>

Tangram Game

Rearrange the seven geometrical shapes that are given to form various shapes.

<http://www.turtlediary.com/game/tangrams.html>

Interactivate! Tessellate

An online, interactive tool for creating your own tessellations. Choose a shape, then edit its corners or edges. The program automatically changes the shape so that it will tessellate (tile) the plane. Then push the tessellate button to see your creation!

<http://www.shodor.org/interactivate/activities/Tessellate>

Online Kaleidoscope

Create your own kaleidoscope creation with this interactive tool.

http://www.zefrank.com/dtoy_vs_byokal/

AREA AND PERIMETER

Free Worksheets for Area and Perimeter

Create customizable worksheets for the area and the perimeter of rectangles. Options include using images, generating word problems, or problems where the student writes an expression for the area using the distributive property.

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

FunBrain: Shape Surveyor Geometry Game

An easy game that practices finding either the perimeter or area of rectangles.

<http://www.funbrain.com/poly/index.html>

Perimeter Shapes Shoot Game

“Shoot” the shapes that have the given perimeter.

<http://www.sheppardsoftware.com/mathgames/geometry/shapeshoot/PerimeterShapesShoot.htm>

Perimeter at Gordons

Work out the perimeter of the shapes. There are many options to choose from.

<http://www.wldps.com/gordons/Perimeter.swf>

Shape Explorer

Find the perimeter and area of odd shapes on a rectangular grid.

<http://www.shodor.org/interactivate/activities/ShapeExplorer/>

Area of Rectangle

Drag the corners of the rectangle and see how the side lengths and areas change.

<http://illuminations.nctm.org/ActivityDetail.aspx?ID=46>

Build a Robot

Collect six parts to build your own robot by answering questions about perimeter.

http://www.learnalberta.ca/content/me3us/flash/lessonLauncher.html?lesson=lessons/12/m3_12_00_x.swf

Area Shapes Shoot Game

Click on the shapes that show the given area.

<http://www.sheppardsoftware.com/mathgames/geometry/shapeshoot/AreaShapesShoot.htm>

Math Playground: Party Designer

You need to design areas for the party, such as a crafts table, food table, seesaw, and so on, so they have the given perimeters and areas.

<http://www.mathplayground.com/PartyDesigner/PartyDesigner.html>

Zoo Designer

You have been hired to design five enclosures for the animals at a local zoo. Use your knowledge of area and perimeter to design the correct enclosures and to earn your ZooDesigner Points.

<http://mrnussbaum.com/zoo/>

Area and Perimeter Dominoes

Match the values of the domino tiles with adjacent domino tiles. Use up all the tiles as soon as you can.

<http://www.turtlediary.com/game/calculating-area-and-perimeter.html>

Perimeter Game from Cyram.org

An online quiz for finding the perimeter of rectangles, triangles, or compound rectangles where not all side lengths are given.

<http://www.cyram.org/Projects/perimetergame/index.html>

Area and Perimeter Builder

Create your own rectangular shapes using colorful blocks and explore the relationship between perimeter and area. You can choose to show the side lengths to understand how a perimeter works. You can also use two work areas (grids) to compare the area and perimeter of two shapes side-by-side. Lastly, challenge yourself in the game screen to build shapes or find the area of various figures.

http://phet.colorado.edu/sims/html/area-builder/latest/area-builder_en.html

Math Playground: Measuring the Area and Perimeter of Rectangles

Amy and her brother, Ben, explain how to find the area and perimeter of rectangles and show you how changing the perimeter of a rectangle affects its area. After the lesson, you will use an interactive ruler to measure the length and width of 10 rectangles, and to calculate the perimeter and area of each.

http://www.mathplayground.com/area_perimeter.html

Everything you wanted to know about area and perimeter

Short explanations of how to find the perimeter of simple shapes and the area of rectangles, followed by quizzes on three levels. In perimeter, level two, some side lengths are not given. In level three, you calculate the perimeter of compound shapes. In the area of rectangles, level 1 has just rectangles, and levels 2 and 3 have compound shapes made of rectangles.

www.bgfl.org/custom/resources_ftp/client_ftp/ks2/maths/perimeter_and_area/index.html

XP Math: Find Perimeters of Parallelograms

This online quiz shows you parallelograms and rectangles, and you need to calculate the perimeter, including typing in the right unit, and not using the altitude of the parallelogram.

<http://www.xpmath.com/forums/arcade.php?do=play&gameid=10>

Area and the Distributive Property Quiz

Use area models to represent the distributive property in finding area of rectangles.

<https://www.khanacademy.org/math/cc-third-grade-math/cc-third-grade-measurement/cc-third-grade-area-distributive-property/e/area-and-the-distributive-property>

MULTIPLY BY MULTIPLES OF TEN

Math Slot Machine

Practice multiplying by multiples of 10 (such as 6×40) in this Vegas-style fun game.

<http://www.xpmath.com/forums/arcade.php?do=play&gameid=119>

Multiplying by Multiples of Ten

Drag the correct answer over to its problem.

http://mrnussbaum.com/grade_3_standardsmultbytens/

Multiplication Quiz

Practice your skills of multiplying by multiples of ten in this 10-question online quiz.

<http://www.thatquiz.org/tq-1/?-jkg04-lc-p0>

SOLIDS

Identify solids

Select the name and drop it on the correct solid.

<http://www.softschools.com/math/geometry/shapes/solids/games/>

Identify solids

Click to identify the partially buried 3-dimensional shapes.

<http://www.primaryresources.co.uk/online/longshape3d.html>

Geometric Solids

Manipulate various geometric solids. Color the solid to investigate properties such as the number of faces, edges, and vertices.

<http://illuminations.nctm.org/ActivityDetail.aspx?ID=70>

Under the Sea

First, choose 3-D shapes. Then, click on a “magic crystal” to start an activity.

<http://www.learnalberta.ca/content/me3usa/flash/index.html?goLesson=14>

2-D and 3-D Shapes

Learn about different solids and see them rotate.

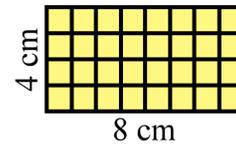
http://www.bgfl.org/bgfl/custom/resources_ftp/client_ftp/ks2/maths/3d/index.htm

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Area and Perimeter Problems

Sometimes it's easy to confuse perimeter and area.

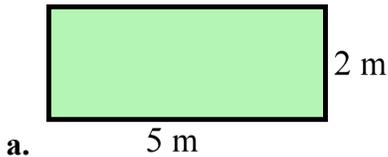
- AREA has to do with covering the shape with squares. Your answer will be in square centimeters, square inches, square feet, square meters, or just square units.
- PERIMETER has to do with “going all the way around.” Your answer will be in some unit of length, such as centimeters, meters, inches, or feet.



Area: $4 \text{ cm} \times 8 \text{ cm} = 32 \text{ cm}^2$.

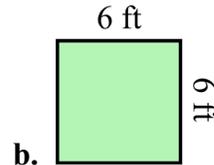
Perimeter:
 $4 \text{ cm} + 8 \text{ cm} + 4 \text{ cm} + 8 \text{ cm} = 24 \text{ cm}$

1. Find the area and perimeter of the rectangles.



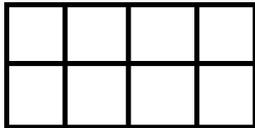
Perimeter = _____

Area = _____



Perimeter = _____

Area = _____



c. 4 in. wide, 2 in. tall

Perimeter = _____

Area = _____



d. A square with 3 cm sides

Perimeter = _____

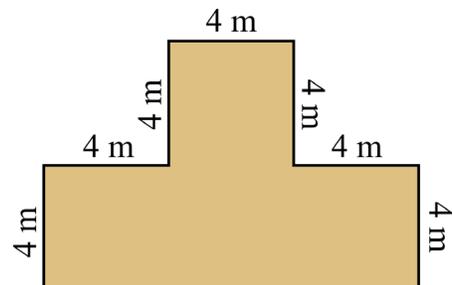
Area = _____

2. Find the area and perimeter of this shape.

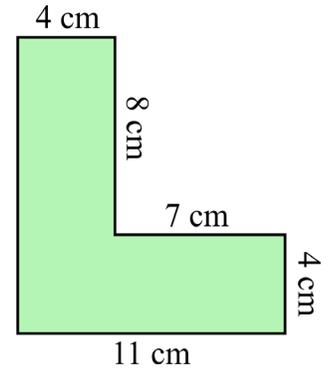
Notice that one side length is not given.
 You need to figure that out.

Area:

Perimeter:



3. Find the area and perimeter of this shape.
Notice that one side length is not given.
You need to figure that out.



Area:

Perimeter:

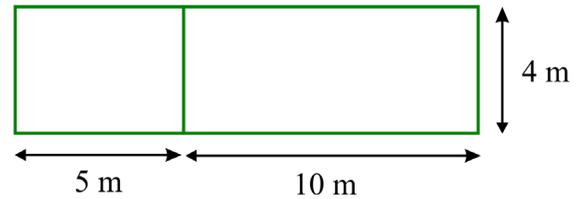
4. This is a two-part lawn.

- a. Find the areas of the two parts.

_____ and _____

- b. Find the total area.

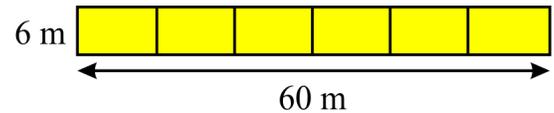
- c. Find the perimeter.



5. Find the total area of this rectangle,
and also the area of each little part.

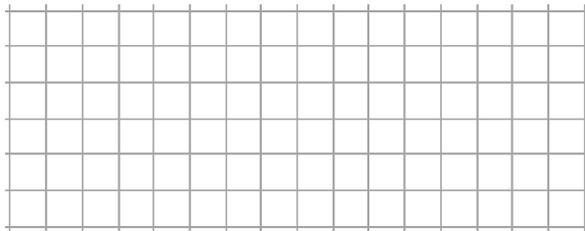
Area of each part:

Total area:

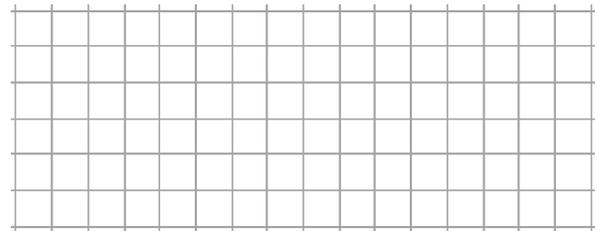


Puzzle Corner

Can you draw these rectangles? Guess and check!



- a. Draw a rectangle with an area of 39 squares, and a perimeter of 32 units.



- b. Draw a rectangle with an area of 56 squares, and a perimeter of 36 units.

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Chapter 8: Measuring

Introduction

In this chapter we delve into both customary and metric measuring units.

Note: If you have the downloadable version of this book (PDF file), you need to print the pages as 100%, not “shrink to fit,” “print to fit,” or similar. If you print “shrink to fit”, some exercises about measuring in inches and centimeters will not come out right, but will be “shrunk” compared to reality.

First, students learn about units of length. We start the chapter by measuring to the nearest quarter of an inch. Since most rulers measure to the eighth or sixteenth part of an inch, it is helpful to cut out a ruler from the lesson that only has tick marks for every fourth of an inch, and tape that onto an existing ruler.

Next, students measure using centimeters and millimeters. They also create line plots from measurement data where the horizontal scale is marked off in quarters of an inch.

The next two lessons help students become familiar with feet, yards, miles, meters, and kilometers — the units for measuring medium and long distances.

Then it is time to measure weight. The first lesson deals with pounds and ounces, and the next one with grams and kilograms. It is very helpful if you can use a kitchen scale for these lessons.

Lastly, we study liquid volume, first of all with customary units (cup, pint, quart, and gallon) and then with metric units (liter and milliliter).

Many of the lessons in this chapter also have an optional section about conversions between measuring units, such as changing three meters into centimeters, or two feet into inches. Converting between units is beyond the Common Core standards for third grade (it is actually included in the 4th and 5th grade standards), but I have included some easy conversion problems here, because I feel many third graders are ready for them.

We all use various measuring units in our everyday lives, and using them is the key to remembering what they are, how big they are, and what the conversion factors are. Naturally, people in the United States don't use the metric system a lot, while people elsewhere don't use the customary system. The units that you don't use are likely to be forgotten easily. So encourage the student(s) to have free play time with measuring devices such as scales, measuring cups, measuring tapes, and rulers.

The Lessons

	page	span
Measuring to the Nearest Fourth-Inch	87	4 pages
Centimeters and Millimeters	91	4 pages
Line Plots and More Measuring	95	3 pages
Feet, Yards, and Miles.....	98	2 pages
Meters and Kilometers	100	2 pages
Pounds and Ounces	102	4 pages
Grams and Kilograms	106	4 pages
Cups, Pints, Quarts, and Gallons	110	3 pages
Milliliters and Liters	113	2 pages
Mixed Review	115	2 pages
Review	117	2 pages

Helpful Resources on the Internet

You can use these free online resources to supplement the “bookwork” as you see fit.

GENERAL

Measures

An online activity about metric measuring units and how to read scales, a measuring cup, and a ruler.

Note: you will need to use the British spellings “centimetres” and “millilitres” in the activity.

http://www.bgfl.org/bgfl/custom/resources_ftp/client_ftp/ks2/maths/measures

Conversion Quizzes - ThatQuiz.org

Create customizable quizzes about conversions between measuring units.

<http://www.thatquiz.org/tq-n/science/metric-system/>

Reading Scales

Illustrate how to read a variety of measuring devices, such as scales, measuring cup, thermometer. You can generate examples using different scales on different devices.

<http://www.teacherled.com/resources/dials/dialsload.html>

MEASURING LENGTH

The Ruler Game

Click on the given measurement on a ruler. You can choose to practice whole inches, halves, $\frac{1}{4}$, $\frac{1}{8}$, or $\frac{1}{16}$ parts of an inch.

<http://www.rulergame.net/>

Measure It!

Practice measuring lines with either centimeters or inches. Multiple choice questions.

<http://www.funbrain.com/measure>

Reading a Tape Measure Worksheets

Generate printable worksheets - you can choose to which accuracy to measure: inches, or inches and feet.

http://themathworksheetsite.com/read_tape.html

Reading a Metric Ruler

This page has illustrated instructions and then a short practice exercise.

<http://www.texasgateway.org/node/3970>

Online Measurement Game

Drag the pointer to the position on the ruler that corresponds to the correct answer.

<http://www.bigiqkids.com/MeasurementGame.shtml>

Measuring - Find Lengths with a Ruler

Drag the ruler to measure the length of the given lines. Choose “Tenths” for this grade level, then enter the length using a decimal, such as 0.3 cm.

<http://www.abcya.com/measuring.htm>

Metric Length Matching

Match the correct conversions.

<http://www.sheppardsoftware.com/mathgames/measurement/MeasurementMeters.htm>

LINE PLOTS

Data Analysis: Line Plots

First, play a game. Then, make a line plot using the game scores.

<http://www.k5learning.com/sample-lessons/grade-3-data-analysis>

Solve Problems with Line Plots

Answer questions using line plots and data sets.

<https://www.khanacademy.org/math/early-math/cc-early-math-measure-data-topic/cc-early-math-line-plots/e/solving-problems-with-line-plots-1>

MEASURING WEIGHT/MASS

Interactive Measuring Scales

Add weights to the scales and choose to show or hide the total weight.

http://www.taw.org.uk/lic/itp/itps/measuringScales_1_8.swf

Scales Reader

Simple online practice of reading the scales. Choose “up to 500 g” or “up to 1 kg” for this level.

<http://www.ictgames.com/weight.html>

Mostly Postie!

Choose “grams”. Place a letter on the scale, and enter the reading, and click “check.”

<http://www.ictgames.com/mostlyPostie.html>

Ounce or Pound

Click and drag to show which unit you would use to weigh the object.

http://www.harcourtschool.com/activity/ounces_pounds/

Get the Weight

Estimate the weight of the items that are placed on the balance scale. The longer you hold down the mouse button, the bigger your estimate of its weight. Available both for customary and metric units.

<http://www.mathnook.com/math/get-the-weight-standard.html>

<http://www.mathnook.com/math/get-the-weight-metric.html>

Best Measure

Match each thing with its best estimated weight.

<http://www.sheppardsoftware.com/mathgames/measurement/BestMeasure2.htm>

Measurement Game for Kids

Measure the length and weight of various parcels using the interactive scales and ruler, so you can give them a stamp with the correct postage rate. Uses grams and centimeters.

<http://www.kidsmathgamesonline.com/geometry/measurement.html>

VOLUME/CAPACITY

Gallon Bot or Gallon Man

This is a graphical creation that allows students to better visualize the customary units of volume.

<https://www.superteacherworksheets.com/pz-gallon-man.html>

Measure Capacity Activity

Click on the various containers to pour their contents into the measuring cup in the middle.

<http://www.iboard.co.uk/iwb/Measure-Capacity-Simple-114>

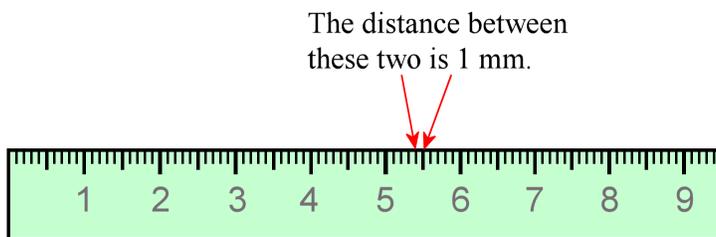
Sample worksheet from
www.mathmammoth.com

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Centimeters and Millimeters

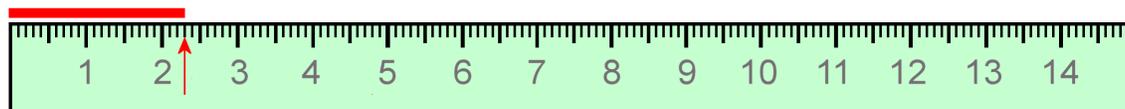
This ruler measures in centimeters. The numbers signify whole centimeters. All the shorter lines between those are for *millimeters*.

The distance from one short line to the next line is *1 millimeter*. We write 1 mm. Millimeters are very tiny!



Look at the ruler: **there are 10 millimeters in each centimeter.**

Measuring lines: First see how many whole centimeters long the line is. Then count how many little millimeter-lines beyond that it reaches.



This line is 2 cm 3 mm long. At the same time, it is 23 mm long. Why?

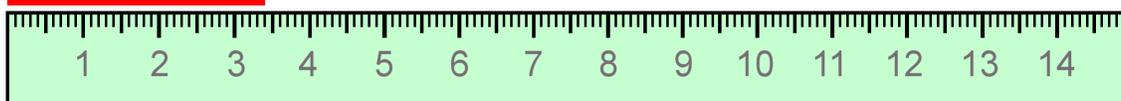
Each centimeter is 10 mm, so 2 cm is 20 mm. That means 2 cm 3 mm makes 23 mm in total.



This line is 4 cm 8 mm long. At the same time, it is 48 mm long.

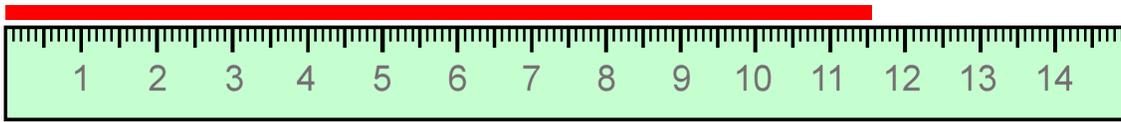
1. Measure the lines using the ruler, first in whole centimeters and millimeters. Then write their lengths using millimeters only.

a. _____ cm _____ mm = _____ mm

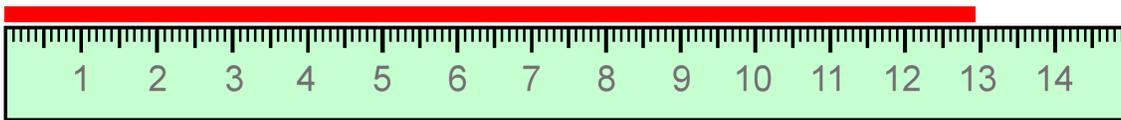


b. _____ cm _____ mm = _____ mm

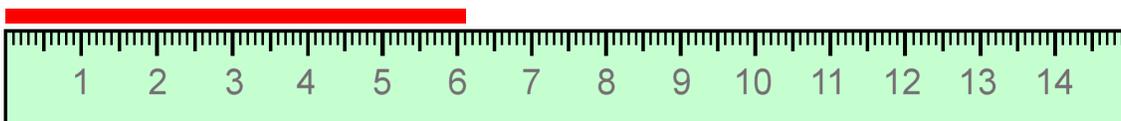




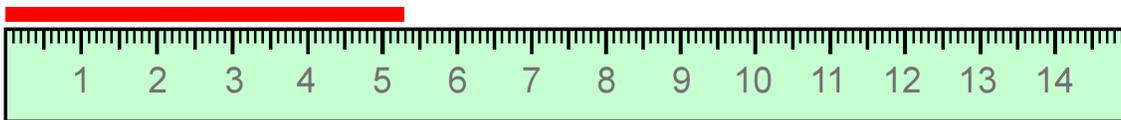
c. _____ cm _____ mm = _____ mm



d. _____ cm _____ mm = _____ mm



e. _____ cm _____ mm = _____ mm



f. _____ cm _____ mm = _____ mm

2. Draw lines using a ruler.

a. 7 cm 8 mm

b. 10 cm 5 mm

c. 14 mm

d. 55 mm

e. 126 mm

3. Measure items you can find at home, using a centimeter-millimeter ruler.
If the item is not exactly as long as the markers on the ruler, choose the nearest mark.

Item	Length

4. Change between centimeters and millimeters.

a.	b.	c.
1 cm = _____ mm	1 cm 1 mm = <u>11</u> mm	4 cm 5 mm = _____ mm
2 cm = _____ mm	1 cm 2 mm = _____ mm	2 cm 5 mm = _____ mm
5 cm = _____ mm	1 cm 8 mm = _____ mm	7 cm 8 mm = _____ mm
8 cm = _____ mm	2 cm 3 mm = _____ mm	10 cm 4 mm = _____ mm

5. Change between millimeters and centimeters.

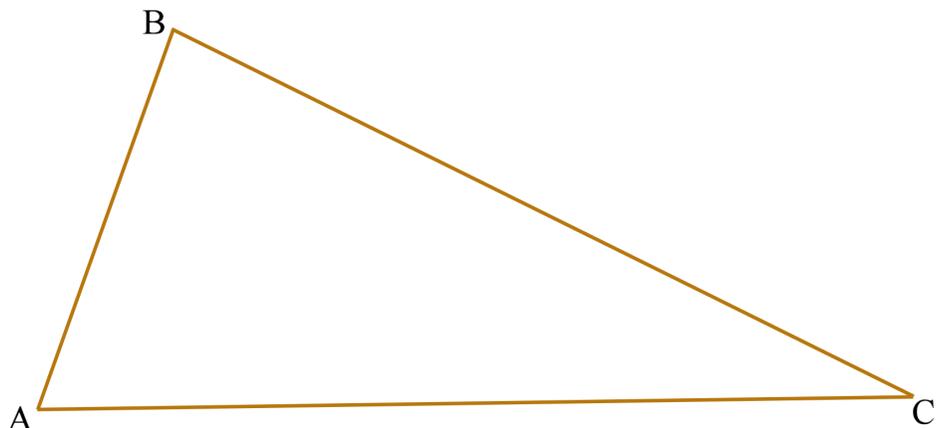
a.	b.	c.
70 mm = _____ cm	12 mm = ____ cm ____ mm	89 mm = ____ cm ____ mm
100 mm = _____ cm	45 mm = ____ cm ____ mm	102 mm = ____ cm ____ mm

6. Measure the sides of this triangle in millimeters.

Side AB _____ mm

Side BC _____ mm

Side CA _____ mm



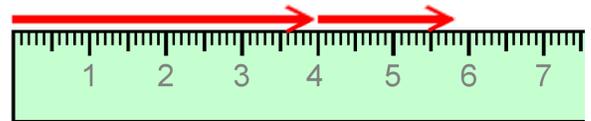
7. Find the perimeter of the triangle in the previous exercise.

8. Draw the third side of this triangle.
Then measure its sides.
Lastly, find its perimeter in millimeters.



The first arrow is 4 cm. The second arrow is 1 cm 8 mm. How long are they together?
Add, giving your answer in millimeters.

$$4 \text{ cm} + 1 \text{ cm } 8 \text{ mm} = 5 \text{ cm } 8 \text{ mm} = 58 \text{ mm}$$



Add centimeters with centimeters, and millimeters with millimeters.
Remember that 10 millimeters makes 1 centimeter.

$$9 \text{ mm} + 6 \text{ cm} + 2 \text{ mm} = 6 \text{ cm } 11 \text{ mm} = 7 \text{ cm } 1 \text{ mm} = 71 \text{ mm}$$

If you have both millimeters and centimeters, change the centimeters to millimeters first:

$$84 \text{ mm} + \underline{3 \text{ cm}} + 9 \text{ mm} = 84 \text{ mm} + \underline{30 \text{ mm}} + 9 \text{ mm} = 123 \text{ mm} \text{ (which is also } 12 \text{ cm } 3 \text{ mm)}$$

9. Work out these “line additions.” Give your answers in millimeters.

a. 1 cm 5 mm + 5 mm	b. 28 mm + 7 cm
c. 5 mm + 5 cm 8 mm	d. 2 cm 4 mm + 4 cm 5 mm
e. 52 mm + 2 cm 4 mm	f. 6 cm + 8 mm + 17 mm
g. 9 mm + 17 mm + 2 cm	h. 139 mm + 50 cm + 2 mm

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Chapter 9: Division

Introduction

The ninth chapter of *Math Mammoth Grade 3* covers the concept of division, basic division facts that are based on the multiplication tables, and the concept of remainder. The aim is to lay a good foundation for the concept of division, cementing the link between multiplication and division.

The concept of division in itself is not difficult—after all, it is like backwards multiplication. From that follows that the student needs to know the multiplication tables well as a prerequisite for this chapter. The student can start studying the lessons in this chapter even if he still needs some practice with the multiplication tables, but if he is a long ways from mastering them, he should not study this chapter yet.

There are basically two ways to illustrate division with concrete objects. The first way is equal sharing: we divide or share items equally between people. For example, the problem $12 \div 3$ would mean, “If you share 12 bananas equally between 3 people, how many bananas does each one get?”

The second way has to do with grouping. The problem $12 \div 3$ would be, “If you have 12 items, how many groups of three items can you make?” These two interpretations of division are important to understand so that the student can solve real-life and mathematical problems involving division.

We also study division by zero. From studying that lesson, students should recognize that division by zero “does not work.” I realize that in higher forms of mathematics, division by zero may be defined (such as $1 \div 0 = \text{infinity}$), but for now, this is the understanding that a third grader should get.

Lastly, students study the concept of remainder, or division that is not exact. We start by letting the students find the remainder using visual models (you could also use manipulatives). Then they learn how to find the remainder by calculating. This concept will be studied again in fourth grade.

The Lessons

	page	span
Division as Making Groups	122	4 pages
Division and Multiplication	126	4 pages
Division and Multiplication Facts	130	3 pages
Dividing Evenly into Groups	133	4 pages
Division Word Problems	137	3 pages
Zero in Division	140	3 pages
When Division Is Not Exact	143	3 pages
More Practice with the Remainder	146	2 pages
Mixed Review	148	2 pages
Review	150	2 pages

Helpful Resources on the Internet

Use these online resources as you see fit to supplement the main text.

CONCEPT OF DIVISION

Sharing

Solve word problems involving sharing. Choose “with remainders”.

<http://www.topmarks.co.uk/Flash.aspx?f=sharingv2>

Airline Grouping

Practice division as making groups.

<http://www.ictgames.com/airlineGrouping/airlineGrouping.html>

Division by Sharing Fish

Drag and drop the fish to “share” them into the fish tanks. Fill in the empty boxes.

<http://www.snappymaths.com/multdiv/earlymultdiv/interactive/sharing2/sharingframe.htm>

DIVISION FACTS

Puzzle Pics Division

Drag the puzzle pieces to the correct answers and reveal the mystery picture!

http://www.mathplayground.com/puzzle_pics_division.html

Flying High Division

Fly your plane safely through the storm clouds by answering questions correctly.

<http://www.multiplication.com/games/play/flying-high-division>

Math Mahjong - Division

Try to match all the tiles.

http://www.sheppardsoftware.com/mathgames/mahjong/mahjongMath_division_easy.htm

Bike Racing Math Division

Win the race by clicking on the correct answer to speed up the motorcycle.

<http://www.mathnook.com/math/bike-racing-math-division.html>

Operation Snowman

Choose which operation you would use to solve the word problems.

http://www.harcourtschool.com/activity/operation_snowman/

Division Flashing Numbers

Divide each number by the given number and click on the flashing sign beneath when it is showing the right answer.

<http://www.topmarks.co.uk/Flash.aspx?b=maths/division>

Math Magician games

Flashcard problems in all four operations. Answer 20 questions in one minute.

<http://www.oswego.org/ocsd-web/games/Mathmagician/mathsdiv.html>

Cross the Swamp

Help Little Ron move from log to log across the swamp and practice multiplication/division or addition/subtraction.

<http://www.bbc.co.uk/schools/starship/maths/crosstheswamp.shtml>

Tux Math

A free software for practicing math facts with many options. Includes all operations. You need to shoot falling comets that can damage penguins' igloos.

<http://sourceforge.net/projects/tuxmath>

MISCELLANEOUS

Dividing by Zero at Maths is Fun

This page gives illustrations of why division by zero is undefined.

<https://www.mathsisfun.com/numbers/dividing-by-zero.html>

Division Facts with Remainders

Type the answers into the boxes and click “check”.

<http://www.mathplayground.com/division02.html>

Rags to Riches Word Problems

Solve math problems about Water Park and you will win tickets to the park!

<https://www.quia.com/rr/10249.html>

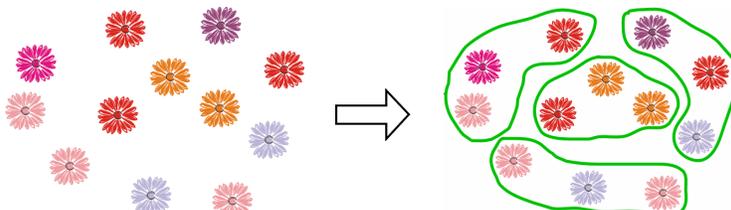
Word Problems With Katie

Practice multiplication and division with these simple word problems.

<http://www.mathplayground.com/WordProblemsWithKatie2.html>

Division as Making Groups

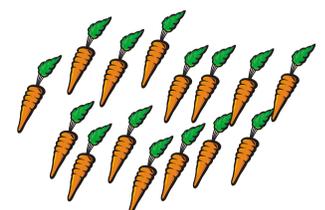
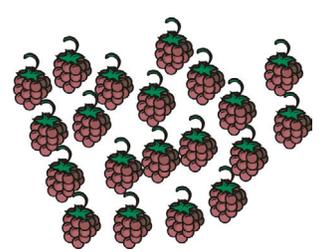
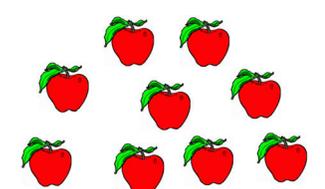
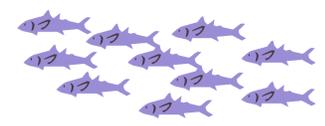
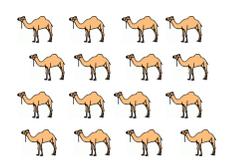
There are 12 daisies. Make groups of 3.

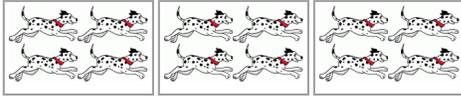


How many groups? Four groups.

How many 3's are there in 12? Four.

1. Divide into groups.

<p>a. There are <u>15</u> carrots. Make groups of 5.</p>  <p>How many groups? _____</p> <p>How many 5's are there in <u>15</u>? _____</p>	<p>b. There are _____ berries. Make groups of 4.</p>  <p>How many groups? _____</p> <p>How many 4's are there in _____? _____</p>	<p>c. There are _____ apples. Make groups of 3.</p>  <p>How many groups? _____</p> <p>How many 3's are there in _____? _____</p>
<p>d. There are _____ fish. Make groups of 2.</p>  <p>How many groups? _____</p> <p>How many 2's are there in _____? _____</p>	<p>e. There are _____ daisies. Make groups of 6.</p>  <p>How many groups? _____</p> <p>How many 6's are there in _____? _____</p>	<p>f. There are _____ camels. Make groups of 4.</p>  <p>How many groups? _____</p> <p>How many 4's are there in _____? _____</p>



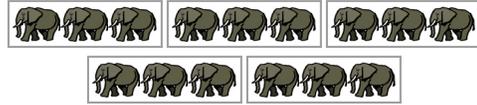
DIVIDE... 12 dogs into groups of four.

How many groups? Three

How many 4's in 12? _____

$$12 \div 4 = 3$$

“Twelve divided by four is three.”



DIVIDE... 15 elephants into groups of three.

How many groups? _____

How many 3's in 15? _____

$$15 \div 3 = 5$$

“Fifteen divided by three is five.”

$18 \div 6 = ?$ *Think:* If you DIVIDE 18 into groups of six, how many groups are there? How many groups of six are there in 18? How many sixes are there in 18?

Since $6 + 6 + 6 = 18$, there are THREE sixes in 18. So, $18 \div 6 = 3$

2. Write a division sentence to fit the pictures in exercise 1.

a. _____ \div _____ = _____	b. _____ \div _____ = _____	c. _____ \div _____ = _____
d. _____ \div _____ = _____	e. _____ \div _____ = _____	f. _____ \div _____ = _____

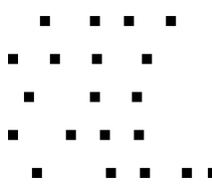
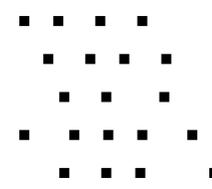
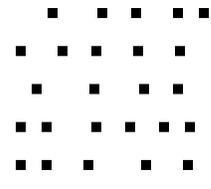
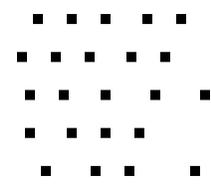
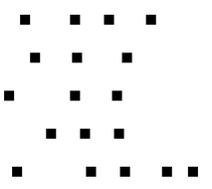
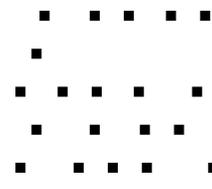
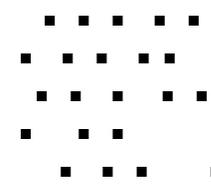
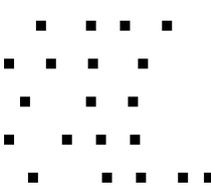
3. Make a division sentence.

<p>a. Divide 10 rams into groups of two. How many groups?</p> <p>_____ \div _____ = _____</p>	<p>b. Divide _____ camels into groups of four. How many groups?</p> <p>_____ \div _____ = _____</p>	<p>c. Divide _____ apples into groups of six. How many groups?</p> <p>_____ \div _____ = _____</p>
<p>d. Divide _____ books into groups of three. How many groups?</p> <p>_____ \div _____ = _____</p>	<p>e. Divide _____ scissors into groups of five. How many groups?</p> <p>_____ \div _____ = _____</p>	<p>f. Divide _____ crosses into groups of three. How many groups?</p> <p>_____ \div _____ = _____</p>

4. Draw sticks. Divide them into groups to fit the division sentence.

a. $18 \div 3 = \underline{\hspace{2cm}}$	b. $24 \div 2 = \underline{\hspace{2cm}}$
c. $21 \div 3 = \underline{\hspace{2cm}}$	d. $25 \div 5 = \underline{\hspace{2cm}}$
e. $15 \div 5 = \underline{\hspace{2cm}}$	f. $24 \div 8 = \underline{\hspace{2cm}}$

5. Make groups by circling dots and write a division sentence.

<p>a. Make groups of 4</p>  <p>$\underline{\hspace{2cm}} \div 4 = \underline{\hspace{2cm}}$</p>	<p>b. Make groups of 2</p>  <p>$\underline{\hspace{2cm}} \div 2 = \underline{\hspace{2cm}}$</p>	<p>c. Make groups of 6</p>  <p>$\underline{\hspace{2cm}} \div 6 = \underline{\hspace{2cm}}$</p>	<p>d. Make groups of 3</p>  <p>$\underline{\hspace{2cm}} \div 3 = \underline{\hspace{2cm}}$</p>
<p>e. Make groups of 5</p>  <p>$\underline{\hspace{2cm}} \div 5 = \underline{\hspace{2cm}}$</p>	<p>f. Make groups of 7</p>  <p>$\underline{\hspace{2cm}} \div 7 = \underline{\hspace{2cm}}$</p>	<p>g. Make groups of 6</p>  <p>$\underline{\hspace{2cm}} \div 6 = \underline{\hspace{2cm}}$</p>	<p>h. Make groups of 10</p>  <p>$\underline{\hspace{2cm}} \div 10 = \underline{\hspace{2cm}}$</p>

6. Solve the word problems. Write a division or a multiplication for each problem.

The box is for the \times or \div symbol.

<p>a. The class has 20 students. You can fit five students into a van. How many vans are needed?</p> <p>_____ <input type="text"/> _____ = _____</p>	<p>b. Ken placed 30 marbles in rows of 5. How many rows did he get?</p> <p>_____ <input type="text"/> _____ = _____</p>
<p>c. Erica packed hairpins in bags. She put 20 pins in each bag and filled four bags. How many pins were there?</p> <p>_____ <input type="text"/> _____ = _____</p>	<p>d. Kelly packaged 28 T-shirts in bags. She put four shirts in each bag. How many bags did she use?</p> <p>_____ <input type="text"/> _____ = _____</p>
<p>e. Brian has 16 poster boards. He needs four of them to make a big poster board. How many big ones can he make?</p> <p>_____ <input type="text"/> _____ = _____</p>	<p>f. Marlene studied three hours each day for seven days. How many hours did she spend studying in total?</p> <p>_____ <input type="text"/> _____ = _____</p>

7. Solve. You can draw to help. Can you find a pattern?

<p>a.</p> <p>4 \div 2 = _____</p> <p>6 \div 2 = _____</p> <p>8 \div 2 = _____</p> <p>10 \div 2 = _____</p> <p>12 \div 2 = _____</p> <p>14 \div 2 = _____</p> <p>16 \div 2 = _____</p> <p>_____ \div 2 = _____</p> <p>_____ \div 2 = _____</p>	<p>b.</p> <p>20 \div 10 = _____</p> <p>30 \div 10 = _____</p> <p>40 \div 10 = _____</p> <p>50 \div 10 = _____</p> <p>_____ \div 10 = _____</p>	<p>c.</p> <p>10 \div 5 = _____</p> <p>15 \div 5 = _____</p> <p>20 \div 5 = _____</p> <p>25 \div 5 = _____</p> <p>_____ \div 5 = _____</p>
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Chapter 10: Fractions

Introduction

The last chapter of *Math Mammoth Grade 3* deals with a few elementary fraction concepts: the concepts of a fraction and of a mixed number, fractions on a number line, equivalent fractions, and comparing fractions.

First, the student learns to identify fractions in visual models, and to draw “pie models” for some common fractions. You can also use manipulatives or the fraction cutouts provided. In the download version, they are found in their separate folder, and in the printed version, they are appended to the answer key.

Next, students represent fractions on a number line diagram by partitioning the interval from 0 to 1 into equal parts. They also study fractions on number lines that go up to 3 and learn to write whole numbers as fractions.

The lesson about mixed numbers relies on visual models and number lines. I strongly feel that students first need to understand fraction operations and concepts with the help of visual models or manipulatives, and not introducing the various rules for calculations too soon. Students match fractions and mixed numbers, and even convert mixed numbers back into fractions using visual models. The actual rule for the conversion is not introduced on this level.

Next, we study equivalent fractions. Students recognize and generate simple equivalent fractions using visual models and number lines.

Lastly, students compare fractions in special cases, such as when they have the same numerator or the same denominator, or when the comparison can be made from visual models. They also learn that comparisons are valid only when the two fractions refer to the same whole.

The Lessons

	page	span
Understanding Fractions	155	4 pages
Fractions on a Number Line	159	4 pages
Mixed Numbers	163	4 pages
Equivalent Fractions	167	3 pages
Comparing Fractions 1	170	3 pages
Comparing Fractions 2	173	2 pages
Mixed Review	175	2 pages
Fractions Review	177	3 pages

Helpful Resources on the Internet

Use these online resources as you see fit to supplement the main text.

Matching Fractions Level 1

Match each fraction to its visual model.

http://www.sheppardsoftware.com/mathgames/fractions/memory_fractions1.htm

Fractions Splat

Four levels: (1) Identify equal or unequal parts; (2) Identify shapes that are divided into halves, thirds, and fourths; (3) and (4) Find the visual model that matches the given fraction.

http://www.sheppardsoftware.com/mathgames/earlymath/fractions_shoot.htm

Concentration from Illuminations

A matching game you can play by yourself or against a friend, matching fractions to equivalent visual representations. (The game also allows you to play a matching game with whole numbers, shapes, or multiplication facts.) Available also for your phone or tablet.

<http://illuminations.nctm.org/Activity.aspx?id=3563>

Fraction Frenzy 4

Choose the pizza picture that matches the fraction shown using the four arrow keys.

<http://www.mathwarehouse.com/games/our-games/fraction-games/fraction-frenzy-4/>

Fractions Matcher

Match each fraction or mixed number with the corresponding picture.

http://phet.colorado.edu/sims/html/fraction-matcher/latest/fraction-matcher_en.html

Fraction Fling

Identify the fractions or mixed numbers that are illustrated by the models by “shooting” them with a slingshot.

http://www.abcya.com/fraction_fling.htm

Puzzle Pics — Number Line Fractions

Drag the puzzle piece to the number line that illustrates the given fraction, and reveal the mystery picture!

http://www.mathplayground.com/puzzle_pics_fractions.html

Animal Rescue: Fractions Number Line Game

Move the arrow to the correct place on the number line and rescue the animals!

<http://www.sheppardsoftware.com/mathgames/fractions/AnimalRescueFractionsNumberLineGame.htm>

Conceptua Fractions: Identify Fractions

A visual tool that shows fractions or mixed numbers using a pie, a bar, dots, and a number line.

<https://www.conceptuamath.com/app/tool/identifying-fractions>

Clara Fraction's Ice Cream Shop

Convert improper fractions into mixed numbers and scoop the right amount of ice cream flavors onto the cone.

<http://mrnuussbaum.com/clarafraction/>

EQUIVALENT FRACTIONS

Equivalent Fractions

Construct two other, equivalent fractions to the given fraction using a circle or a square. Use the sliders to divide your shape into a certain amount of parts, then click on the parts to color some of them. Click the check mark to check if you got the equivalent fractions right.

<http://illuminations.nctm.org/Activity.aspx?id=3510>

Conceptua Math: Equivalent Fractions

In this tool, you can use pie, rectangular, or number line model. Divide each shape into parts using the sliders. Then click on parts to color or uncolor them.

<https://www.conceptuamath.com/app/tool/equivalent-fractions>

Equivalent Fractions Shoot

Click the fraction picture that is equivalent to the given fraction. Choose “Level 1” for this grade level.

http://www.sheppardsoftware.com/mathgames/fractions/equivalent_fractions_shoot.htm

Fraction Booster

Fraction Booster contains five different activities: (1) Type in the number of children and the computer cuts a pizza into that many pieces. (2) Drag fractional pieces to a fraction mat. (3) Type the number of shaded pieces, the total number of pieces, and the actual fraction (using a slash). (4) Drag and drop fractions onto a fraction number line. (5) Practice equivalent fractions using a pizza as a visual model.

http://www.bgfl.org/bgfl/custom/resources_ftp/client_ftp/ks2/maths/fractions/index.htm

COMPARING

Balloon Pop Fractions

Pop the balloons in order from the smallest to the largest fraction.

http://www.sheppardsoftware.com/mathgames/fractions/Balloons_fractions3.htm

Ordering Fractions

Drag the fractions into the right order, from lowest to highest.

<http://www.topmarks.co.uk/Flash.aspx?b=maths/fractions>

Ordering Mixed and Equivalent Fractions

Put the fractions in order, from least to greatest.

<http://www.dositey.com/2008/MixedEqFractions/Game3/mixedeqfractions3.htm>

Conceptua Math: Order Fractions on a Number Line

First create fractions using the button on the top right, then lock them. Use the “dot” button to see them placed on the number line. Then you can use the buttons on the left to see the fractions represented in different ways. Lastly, drag the fractions under the number line dots, and press the check mark.

<https://www.conceptuamath.com/app/tool/place-fractions-on-a-number-line>

GENERAL

Fractioncity

Children learn about comparing fractions, equivalent fractions, and addition of fractions while they drive toy cars on the “fraction streets”. This is not an online activity but a craft-type activity.

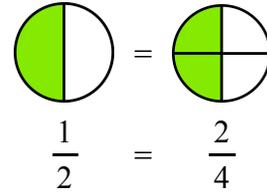
<http://www.teachnet.com/lesson/math/fractioncity.html>

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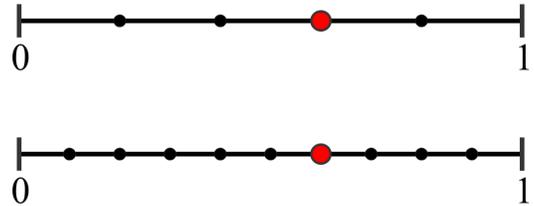
Equivalent Fractions

If you eat half of a pizza or $\frac{2}{4}$ of a pizza you have eaten the same amount. The two fractions are **equivalent**.

We can write an equal sign between them: $\frac{1}{2} = \frac{2}{4}$.



The dot for $\frac{3}{5}$ is in the same place on the number line as the dot for $\frac{6}{10}$. Again, the two fractions are equivalent. We can write $\frac{3}{5} = \frac{6}{10}$.



1. Write the equivalent fractions.

 $\frac{1}{4} = \frac{2}{8}$	 $\frac{2}{3} = \frac{4}{6}$	 $\frac{3}{6} = \frac{1}{2}$	 $\frac{4}{6} = \frac{2}{3}$
<p>a. $\frac{1}{2} = \frac{1}{2}$</p>	<p>b. $\frac{1}{2} = \frac{1}{2}$</p>	<p>c. $\frac{1}{2} = \frac{1}{2}$</p>	<p>d. $\frac{1}{2} = \frac{1}{2}$</p>
<p>e. $\frac{1}{2} = \frac{1}{2}$</p>		<p>f. $\frac{1}{2} = \frac{1}{2}$</p>	

2. Write the equivalent fractions.

 <p>a. $\frac{1}{2} = \frac{1}{2}$</p>	 <p>b. $\frac{1}{2} = \frac{1}{2}$</p>
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3. Shade the parts for the first fraction. Shade the same *amount* in the second picture. Write the second fraction.

=	=	=	=
a. $\frac{1}{4} =$	b. $\frac{1}{2} =$	c. $\frac{6}{8} =$	d. $\frac{2}{3} =$

e. $\frac{1}{3} =$	f. $\frac{8}{12} =$
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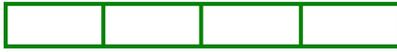
4. Mark the equivalent fractions on the number lines.

 a. $\frac{3}{4} = \frac{6}{8}$	 b. $\frac{3}{9} = \frac{1}{3}$
 c. $\frac{3}{6} =$	 d. $\frac{2}{6} =$

5. Mark the equivalent fractions on the number lines. This time, you need to first divide each number line into equal parts.

 a. $\frac{2}{4} = \frac{1}{2}$	 b. $\frac{2}{3} = \frac{4}{6}$
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6. Color and write many fractions that are equivalent to the first fraction.

<p>a. </p> <p></p> <p></p> <p></p>	<p>$\frac{1}{3}$</p> <p></p> <p></p> <p></p>	<p>b. </p> <p></p> <p></p> <p></p>	<p>$\frac{1}{4}$</p> <p></p> <p></p> <p></p>
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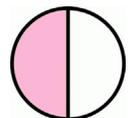
7. Four children have a chocolate bar to share. Cassy says, "Let's divide it into four equal pieces, and everybody gets one piece." Hannah says, "No, let's divide it into twelve equal pieces and everybody gets three pieces."



Whose idea lets everybody get a fair share?

8. Draw a picture to show that $\frac{1}{2} = \frac{4}{8}$.

9. a. Half of the pie is left. Show in the picture how three persons can share it equally.



b. What two equivalent fractions can you write from your "cutting"?

10. Are $\frac{5}{5}$ and $\frac{4}{4}$ equivalent fractions?
Why or why not?

<p>Puzzle Corner</p>	<p>Which is longer, a line that is $3 \frac{1}{2}$ inches long or a line that is $3 \frac{1}{4}$ inches long? How much longer is it?</p>
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