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# Math Mammoth Geometry 1

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# Introduction

*Math Mammoth Geometry 1* covers all the typical geometry topics for grades 4-5: angles, triangles, quadrilaterals, other polygons, area, perimeter and volume.

The problems in this book involve lots of drawing. Geometry is a hands-on subject, and many children like that. Moreover, drawing is an excellent means of achieving the conceptual understanding that

geometry requires. Exercises marked with the symbol “” are meant to be done in the student’s notebook or on blank paper.

The study of geometry is also full of new vocabulary. I encourage the usage of a *geometry notebook*, where students will write every new concept or term, and draw a picture or pictures and text to explain the term. That will help them to remember the terms better, and most children will like creating a book of their own. The students can also do the drawing exercises in this book.

## The lessons in the book

First we review the area and perimeter of rectangles (as taught in third grade). Then the students are introduced to **angles**, and learn about acute, right, obtuse, and straight angles. Students learn how to measure angles with a protractor, draw angles, and estimate some common angles.

After angles, we study **parallelograms** and different **kinds of triangles** (acute, obtuse, right). We also review polygons and then go on to a lesson about **circles**. Students learn the terms circle, radius, and diameter, and learn to draw circles and circle designs using a compass.

Then we go on to **classify quadrilaterals and triangles**. There are seven types of quadrilaterals to learn about, and now students classify triangles both by sides and by angles.

The last section of the book deals with area and perimeter of rectangular shapes, and **volume** of rectangular prisms. I have also included a lesson for problem solving, and two review lessons.

Please see also my geometry videos at [http://www.mathmammoth.com/videos/geometry\\_1.php](http://www.mathmammoth.com/videos/geometry_1.php). Most of them match the topics in this book, and can be used to provide additional instruction for the lessons in this book.

*I wish you success in teaching math!*  
*Maria Miller, the author*

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## Helpful Resources on the Internet

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

### Free Worksheets for the Area and Perimeter of Rectangles

Generate printable and customizable worksheets for area and perimeter of rectangles/squares. Options include images, word problems, writing an expression for area using distributive property, irregular rectangular areas, and more.

[www.homeschoolmath.net/worksheets/area\\_perimeter\\_rectangles.php](http://www.homeschoolmath.net/worksheets/area_perimeter_rectangles.php)

### Classify Quadrilaterals Worksheets

Make free printable worksheets for classifying (identifying, naming) quadrilaterals. There are seven special types of quadrilaterals: square, rectangle, rhombus, parallelogram, trapezoid, kite, scalene, and these worksheets ask students to name the quadrilaterals from these seven types.

[www.homeschoolmath.net/worksheets/classify\\_quadrilaterals.php](http://www.homeschoolmath.net/worksheets/classify_quadrilaterals.php)

### Classify Triangles Worksheets

Make free printable worksheets for classifying triangles by their sides, angles, or both.

[www.homeschoolmath.net/worksheets/classify\\_triangles.php](http://www.homeschoolmath.net/worksheets/classify_triangles.php)

### Worksheets for the Volume and Surface Area of Rectangular Prisms

Customizable worksheets for volume/surface area of cubes and rectangular prisms. Includes the option of using fractional edge lengths.

[www.homeschoolmath.net/worksheets/volume\\_surface\\_area.php](http://www.homeschoolmath.net/worksheets/volume_surface_area.php)

### 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>

### Interactive Quadrilaterals

See all the different kinds of quadrilateral “in action”. You can drag the corners, see how the angles change, and observe what properties do not change.

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

### Polygon Matching Game

[http://www.mathplayground.com/matching\\_shapes.html](http://www.mathplayground.com/matching_shapes.html)

### Polygon Sort

Drag and drop the polygons in the correct place in the diagram.

<http://www.crickweb.co.uk/assets/resources/flash.php?&file=quad>

### Polygon Playground

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

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

### **Geometry - Math Warehouse**

Detailed lessons about angles, triangles, quadrilaterals, circles, similar triangles, parallelograms, polygons, and trapezoids.

<http://www.mathwarehouse.com/geometry/>

### **Interactive Tangram Puzzle**

Place the tangram pieces so they form the given shape.

[http://nlvm.usu.edu/en/nav/frames\\_asid\\_112\\_g\\_2\\_t\\_1.html](http://nlvm.usu.edu/en/nav/frames_asid_112_g_2_t_1.html)

### **Tangram set**

Cut out your Tangram set by folding paper

<http://tangrams.ca/inner/foldtan.htm>

### **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 the calculated side lengths and areas change.

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

### **Symmetry Game**

Tell how many lines of symmetry a shape has.

[http://www.innovationslearning.co.uk/subjects/maths/activities/year3/symmetry/shape\\_game.asp](http://www.innovationslearning.co.uk/subjects/maths/activities/year3/symmetry/shape_game.asp)

### **Online Kaleidoscope**

Create your own kaleidoscope creation with this interactive tool.

[http://www.zefrank.com/dtoy\\_vs\\_byokal/](http://www.zefrank.com/dtoy_vs_byokal/)

### **Primary Resources: Mirror Images**

See images mirrored in a line.

<http://www.primaryresources.co.uk/online/symmetry.swf>

### **Primary Resources: Reflection**

Color the squares and reflect the given pattern in a line.

<http://www.primaryresources.co.uk/online/reflection.swf>

### **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>

### **Cubes**

Fill a box with cubes, rows of cubes, or layers of cubes, and then fold in the sides of the box. Illustrates the concept of volume.

<http://illuminations.nctm.org/ActivityDetail.aspx?ID=6>

### **Cuboid Exploder and Isometric Shape Exploder**

These interactive demonstrations let you see either various cuboids (a.k.a. boxes or rectangular prisms) or various shapes made of unit cubes, and then “explode” them into the unit cubes, illustrating volume.

[www.teacherled.com/resources/cuboidexplode/cuboidexplodeload.html](http://www.teacherled.com/resources/cuboidexplode/cuboidexplodeload.html) and

[www.teacherled.com/resources/isoexplode/isoexplodeload.html](http://www.teacherled.com/resources/isoexplode/isoexplodeload.html)

**Sample worksheet from**

**[www.mathmammoth.com](http://www.mathmammoth.com)**

### **Space Blocks**

Build with blocks to illustrate three-dimensional shapes.

[http://nlvm.usu.edu/en/nav/frames\\_asid\\_195\\_g\\_2\\_t\\_2.html](http://nlvm.usu.edu/en/nav/frames_asid_195_g_2_t_2.html)

### **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.

<http://www.thatquiz.org/tq-f/math/shapes/>

### **Geometry Area/Perimeter Quiz from ThatQuiz.org**

An online quiz, asking either the area or perimeter of rectangles, triangles, and circles. You can modify the quiz parameters to your liking, for example to omit the circle, or instead of solving for area, you solve for an unknown side when the perimeter/area is given.

<http://www.thatquiz.org/tq-4/?-j201v-lc-m2kc0-na-p0>

### **Geometry Bridge**

An interactive review lesson on types of angles, types of triangles, angle sum of a triangle, and the Pythagorean Theorem. You get to build a bridge!

<http://mysite.verizon.net/vzex2lij/>

### **Angle Find!**

Click on the angle with the given angle measure within a geometric figure. Three different modes: Easy Cornering, Parallel Play, and Tangled Angles. Practices your ability to estimate angles and your knowledge of vertical angles, corresponding angles, and angles in a triangle.

<http://puzzlezapper.com/aom/mathed/anglefind/anglefind.html>