Math Mammoth Geometry 1

Contents

Introduction

Math Mammoth Geometry 1 gives the student a thorough view of basic plane geometry. The topics suit best 4th-6th grade mathematics. The emphasis is on learning through drawing.

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 strange-sounding words to learn. I encourage you to get the student(s) started with a *geometry notebook*, where they will write every new concept or term, and draw a picture or pictures and text to explain the term. This notebook will then be their own creation, and while working with it, the terms also will stick better in their memory. The students could also do the drawing exercises in this book, or just keep it as a terminology notebook, either way.

The lessons in the book

The first lessons concentrate on **angles**. Students are introduced to the concept of an angle, 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 various **shapes**: triangles, quadrilaterals, polygons, and circles.

Students are now able to **classify triangles** both in terms of their sides and also in terms of their angles. The lesson has several drawing problems and one easy compass-and-ruler construction of an equilateral triangle.

Then we go on to study the seven different terms used for **classifying quadrilaterals**. Many textbooks concentrate only on learning the vocabulary, but I have also included several problems that require some thought and even one construction, that of a rhombus. I feel just learning the words—"rhombus," "trapezoid," "kite," and so on—is meaningless unless students can also do something with the figures, such as calculate their areas, find their angles, and reason about their properties.

In the lesson about **circles**, we learn the terms circle, radius, and diameter. Students draw circles and circle designs using a compass.

In the middle of the book, there is a brief section about **congruent and similar figures**. These lessons are introductory, as these topics will be studied more in *Math Mammoth Geometry 2*.

Then follow several lessons that focus on **calculating areas**, beginning with the area of a right triangle, which is always half of the area of the corresponding rectangle. Once students learn to calculate the area of a parallelogram and realize that the principle applies not just to right triangles and rectangles, but that the area of *any* triangle is always half of the area of the corresponding parallelogram, then they can split any polygon into triangles and thus find its area.

In the last major section of the book, we study certain aspects of common **solids**: the volume of a rectangular prism, surface areas of some solids, and nets of common solids. (Printable pages of some of the nets are included also.)

The volumes of round-shaped solids, such as cylinders, cones, and spheres, are not studied until middle school, as students first need to study the concept of *pi* (3.1416...) and its relation to the area of a circle. Another limitation is that students cannot yet find the altitude of the triangle from only the lengths of its sides because that requires the Pythagorean Theorem. Because of these limitations, students cannot yet calculate the surface area or volume of most solids, and these calculations are therefore limited here to certain solids only.

I wish you success in your math teaching!

Maria Miller, the author