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# Math Mammoth Fractions 2

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# Introduction

Math Mammoth Fractions 2 continues the study of fraction topics. It deals mainly with multiplication and division, but also studied are comparing fractions and , simplifying.

All topics are again studied first visually, with lots of picture exercises to complete. This helps ensure that the student 'gets it' and understands the concepts, instead of only blindly following a calculation rule. And the study of fractions involves a lot of such rules.

Rules in themselves are not bad; it certainly is easier and quicker to multiply or divide fractions using the rule. It is just that we must not rely on them blindly when we can also understand the basics of what is going on.

*Some of the main lessons are:*

**Comparing fractions** starts with a visual model to prompt the student to think about converting the fractions to have the same denominator. Also included comparing fractions with number lines.

**Simplifying fractions** is presented as joining or merging slices together, in other words as the opposite process of splitting the pieces. Visual models are studied extensively to ensure understanding instead of mere memorization.

## **Multiplying fractions by a whole number**

The lesson discusses multiplying by a whole number as *repeated addition*. Another topic is how fraction times a whole number means fraction *of* that number. For example,  $\frac{1}{4}$  of 20 is expressed mathematically as  $\frac{1}{4} \times 20$ . The lesson shows the interesting connection between  $(fraction) \times (whole\ number)$  and  $(whole\ number) \times (fraction)$  (for example  $\frac{1}{4} \times 20$  and  $20 \times \frac{1}{4}$ ).

## **Multiplying fractions by fractions**

This really is not nearly so difficult a concept as many people think; it is based on the simple notion that for example  $\frac{1}{2} \times \frac{1}{4}$  means half OF one fourth. So if you have one fourth of a pie left, and you take half OF it, you end up with one-eighth part. We will present this notion and try to work towards finding the actual easy rule. Also included a discussion why the rule works.

**Multiplication and area** interprets the process  $(fraction) \times (fraction)$  as an area calculation. Pictures are at the core of understanding this.

**Simplify before multiplying** justifies the rule in a couple of different ways, starting from the notion that if you first multiply and then divide by the same number, you have in essence done nothing.

**Dividing fractions by a whole number** is thought of as dividing part of pie between certain number of people. Then is presented the connection to multiplying by the reciprocal number.

**Dividing fractions by fractions** first discusses mental math problems where you think "how many times does this go into this?" The student is then led to notice how the first easy divisions in the lesson are the same again as multiplying by the reciprocal number. The rule for dividing fractions by fractions is presented.

*Answers are in the end of the book.*

*I wish you success in your math teaching!*

*Maria Miller, the author*