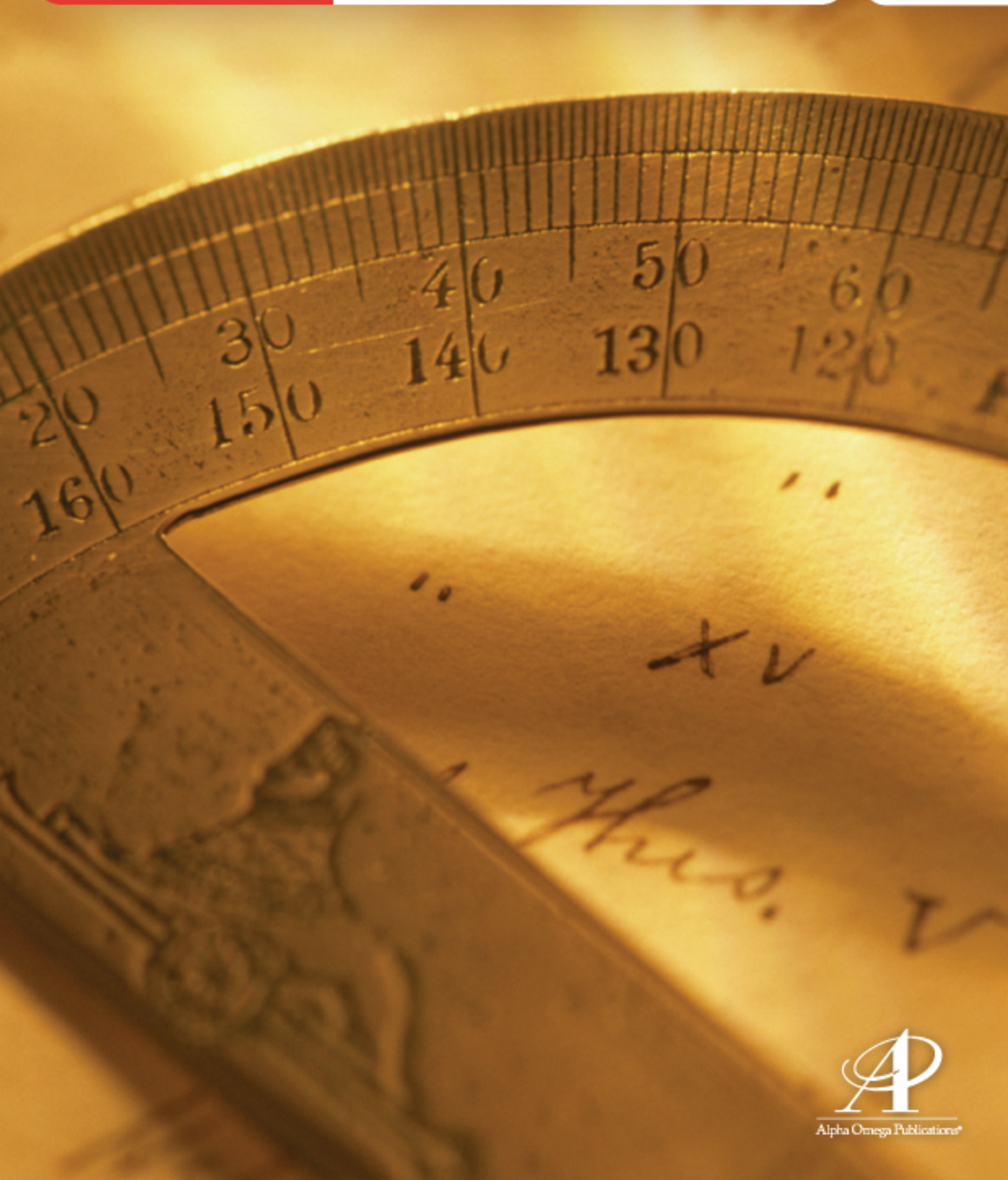
LIFEPAC® Math



Alpha Omega Publications®

MATHEMATICS 707
FRACTIONS: MULTIPLICATION AND DIVISION

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Alpha Omega Publications®

804 N. 2nd Ave. E., Rock Rapids, IA 51246-1759

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MATHEMATICS 707
FRACTIONS: MULTIPLICATION AND DIVISION

In your last Mathematics LIFEPAC®, you learned to add and subtract fractions, both common and decimal. This LIFEPAC will be concerned with the multiplication and division of fractions. The first section will deal with common fractions, and the second section will present decimal fractions. In the third section, you will meet one of the frequent applications of fractions, base-rate-percentage problems.

OBJECTIVES

Read these objectives. The objections tell you what you will be able to do when you have successfully completed this LIFEPAC.

When you have finished this LIFEPAC, you should be able to:

1. Identify and define a common fraction.
2. Multiply common fractions.
3. Reduce fractions to lowest terms.
4. Find and factor out common factors when multiplying fractions.
5. Multiply mixed numbers by changing them to improper fractions.
6. Express improper fractions as mixed numbers.
7. Divide common fractions by multiplying by the inverted divisor.
8. Solve word problems involving multiplication and division of common fractions.
9. Identify and define a decimal fraction.
10. Convert common fractions to decimal fractions.
11. Convert decimal fractions to common fractions.
12. Multiply and divide decimal fractions.
13. Solve word problems involving decimal fractions.
14. Convert percents to decimals and decimals to percents.
15. Identify and find the base, the rate, and the percentage in base-rate-percentage problems.
16. Solve word problems involving base-rate-percentage.

Survey the LIFEPAC. Ask yourself some questions about this study. Write your questions here.

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I. COMMON FRACTIONS

OBJECTIVES

When you have completed this section, you should be able to:

1. Identify and define a common fraction.
2. Multiply common fractions.
3. Reduce fractions to lowest terms.
4. Find and factor out common factors when multiplying fractions.
5. Multiply mixed numbers by changing them to improper fractions.
6. Express improper fractions as mixed numbers.
7. Divide common fractions by multiplying them by the inverted divisor.
8. Solve word problems involving multiplication and division of common fractions.

You will remember that common fractions are symbols for numbers. The common fraction symbol has three parts: a horizontal bar, a whole number above the bar, and a nonzero whole number below the bar.

DEFINITION

Common fraction: a symbol composed of three parts: a horizontal bar, a whole number above the bar, and a nonzero whole number below the bar.

Numerator: the number above the bar in a fraction.

Denominator: the number below the bar in a fraction (can never be zero).

MULTIPLICATION

You already know how to add and subtract common fractions. Now you will learn how to multiply them.

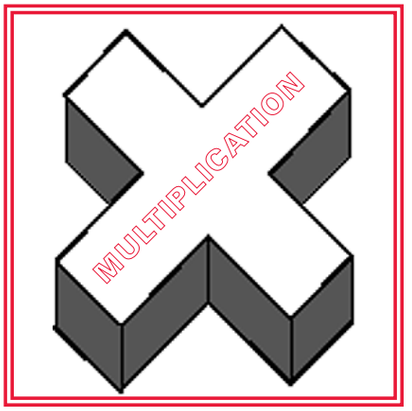
RULE

To multiply two fractions, multiply the numerators to find the new numerator and multiply the denominators to find the new denominator.

Model 1: $\frac{2}{3} \times \frac{4}{5}$

To find the numerator of the answer, multiply the numerators of the two fractions:
2 x 4 = 8.
To find the denominator of the answer, multiply the denominators of the two fractions:
3 x 5 = 15.

Write the new numerator over the new denominator to get the answer: $\frac{8}{15}$.



In symbols: $\frac{2}{3} \times \frac{4}{5} = \frac{2 \times 4}{3 \times 5} = \frac{8}{15}$

Model 2: $\frac{1}{7} \times \frac{2}{3} = \frac{1 \times 2}{7 \times 3} = \frac{2}{21}$

Multiply the following fractions. Show the step where you multiply the numerators and denominators.

1.1 $\frac{1}{3} \times \frac{2}{5} =$ _____

1.2 $\frac{3}{4} \times \frac{1}{2} =$ _____

1.3 $\frac{5}{6} \times \frac{1}{3} =$ _____

1.4 $\frac{3}{4} \times \frac{3}{4}$ _____

Multiply the following fractions. Do the intermediate step in your head.

1.5 $\frac{2}{7} \times \frac{2}{3} =$ _____

1.6 $\frac{3}{5} \times \frac{3}{4} =$ _____

1.7 $\frac{7}{8} \times \frac{1}{3} =$ _____

1.8 $\frac{1}{2} \times \frac{3}{4} =$ _____

1.9 $\frac{1}{6} \times \frac{2}{5} =$ _____

1.10 $\frac{3}{7} \times \frac{1}{4} =$ _____

When we multiply fractions, we always want the answer to be in *lowest terms*. Remember how to reduce a fraction to lowest terms? Sometimes we say "simplest form" instead of lowest terms.

RULE

To reduce a fraction to *lowest terms*, divide numerator and denominator by all their common factors until the only common factor is 1.

Model: Reduce $\frac{16}{18}$ to lowest terms.

Divide both numerator and denominator by 2:

$\frac{16}{18} = \frac{8}{9}$

Reduce the following fractions to lowest terms.

1.11 $\frac{15}{20} =$ _____

1.12 $\frac{14}{21} =$ _____

1.13 $\frac{3}{9} =$ _____

1.14 $\frac{10}{16} =$ _____

You can reduce a fraction to lowest terms in one step if you can find the greatest common factor of the numerator and denominator. Sometimes, however, you may have less trouble reducing a fraction using several steps. That is, sometimes you may wish to divide by an obvious common factor rather than search for the greatest common factor. If the answer you get is not yet in lowest terms, you can simply keep dividing by obvious common factors.