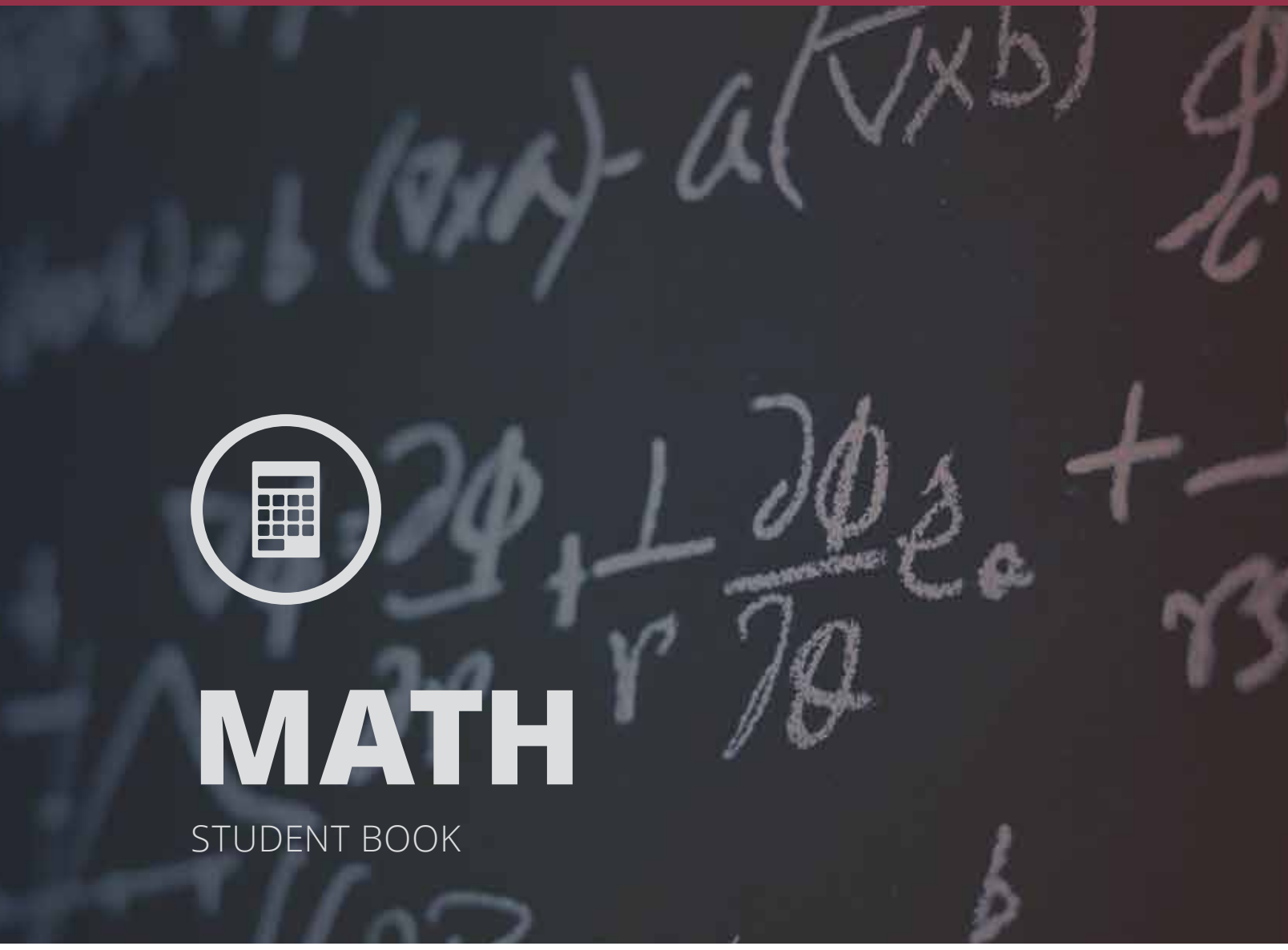
LIFEPAC®



MATH

STUDENT BOOK

7th Grade | Unit 2

Alpha Omega
PUBLICATIONS

Math 702
Fractions

LIFEPAC Test is located in the center of the booklet. Please remove before starting the unit.

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Fractions

Introduction

In this unit, students will learn about the set of numbers that falls between whole numbers. These numbers are known as fractions. Students will learn about the different parts of a fraction, as well as the different types of fractions, such as proper fractions, improper fractions and mixed numbers. Once students are able to identify the different types of fractions, they will learn how to calculate equivalent fractions and simplify, or reduce, fractions. Finally, they will learn how to compute with fractions and mixed numbers.

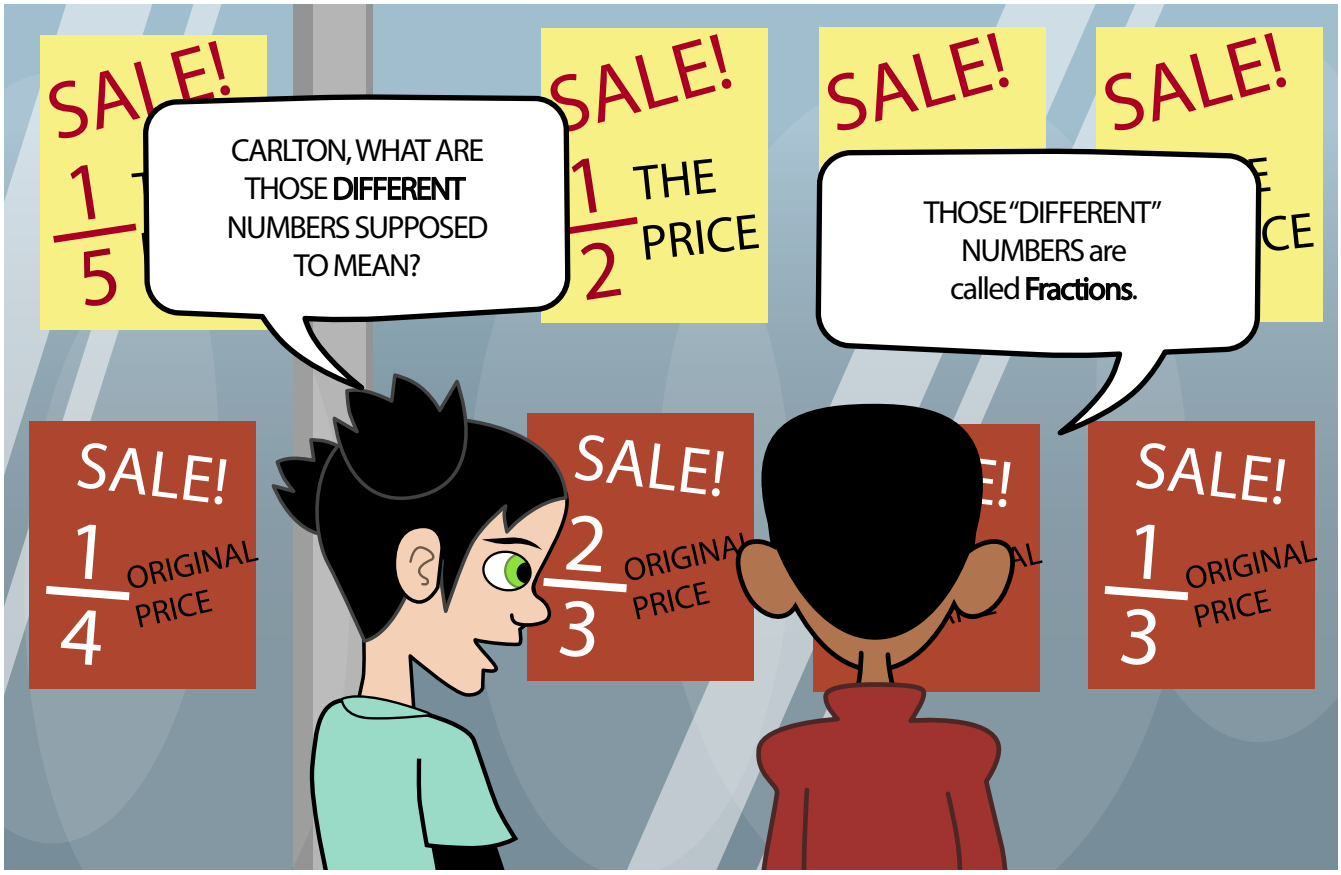
Objectives

Read these objectives. The objectives 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:

- Identify parts of fractions and mixed numbers.
- Identify the different types of fractions.
- Perform operations with fractions and mixed numbers.
- Simplify fractions.
- Compare and order fractions.
- Find equivalent fractions.

1. Working with Fractions

Fractions and Mixed Numbers



Objectives

- Identify the different parts of fractions and mixed numbers.
- Convert between mixed numbers and improper fractions.
- Round fractions and mixed numbers.

Vocabulary

denominator—the number under the fraction line; tells how many equal parts the whole was broken into

fraction—a number that shows part of a whole

improper fraction—a fraction in which the numerator is larger than the denominator

mixed number—a number with an integer part and a fraction part

numerator—the number above the fraction line; tells how many parts of the whole exist

simplified fraction—a fraction written in lowest terms (i.e., the numerator and denominator do not have any more common factors)

Proper Fractions

Did you know that every time you eat pizza, you are entering the world of *fractions*? Fractions are used to show part of a whole. Pizza is a great example of the use of fractions. Take a look.

The pizza is considered to be one whole, or 1. The one pizza can then be cut into smaller pieces so that it can be divided among several people more easily. What if the pizza is cut into eight equal slices?

Fractions consist of two numbers: a *numerator* and a *denominator*. The denominator is the bottom number of the fraction. The denominator tells how many equal parts the whole has been divided into. The pizza was cut into eight equal pieces, so the denominator is 8.

The numerator, or top number, tells you how many pieces of the whole are being talked about. For example, suppose you eat three slices of pizza. You can represent the three slices of pizza you ate by writing the fraction $\frac{3}{8}$. This tells someone who is reading the fraction that you had three of the eight slices of pizza that were available.

Take a look at another example. The picture to the right shows five friends. Can you think of some fractions that you can use to describe the five friends? You could say that $\frac{3}{5}$ of the friends have brown hair. You could also say $\frac{2}{5}$ of them are wearing white shoes.

Fractions are also used in measurements. You might need to use a fraction to describe the length, width, or height of an object. Recipes also commonly involve fractions. Measurements and recipes often use what are called benchmark fractions, or fractions that are very common. The most common denominators are halves (2), thirds (3), fourths (4), and eighths (8). Understanding how to write and interpret fractions will help you outside of math class.

Mixed Numbers

Have you ever seen a whole number followed by a fraction? When you see a whole number followed by a fraction, you are looking at a mixed number. Mixed numbers are used to explain a relationship that is larger than a whole.

You will encounter mixed numbers in many real-world applications. Maybe you have seen mixed numbers used in recipes or baseball statistics. Either way, it is helpful to understand what they mean.

The mixed number $1\frac{3}{8}$ tells you that you have a little more than 1. Take a look at what this looks like in terms of pizza. Suppose that $1\frac{3}{8}$ pizzas have pepperoni on them.

As you can see from the photo, $1\frac{3}{8}$ is equal to one whole pizza with pepperoni and then $\frac{3}{8}$ of a second pizza with pepperoni.

What do you think the mixed number $1\frac{7}{8}$ looks like in terms of pepperoni pizza? If $1\frac{7}{8}$ of the pizzas had pepperoni on them, you would see one entire pizza with pepperoni and then 7 out of 8 slices of the second pizza with pepperoni. It would look like the following picture.

Mixed numbers can have any number as their whole number, not just 1 as you saw in the previous example. See what it would look like if $2\frac{5}{8}$ pizzas had pepperoni on them.

As you can see from the examples, the number in front of the fraction, or the whole number, represents the number of wholes while the fraction tells you how many parts of the next whole are being talked about.

Improper Fractions

An *improper fraction* is a fraction that has a numerator that is larger than the denominator. Improper fractions are used to describe items that are larger than one whole.

Example:

- $\frac{11}{8}$

The improper fraction of $\frac{11}{8}$ has a numerator of 11 and a denominator of 8. This fraction means that you have 11 parts of something that contains 8 parts in a whole. How can you take 11 of something if it only has 8 parts? There are two ways to look at it.

You can see that $\frac{11}{8}$ is really 1 whole and $\frac{3}{8}$ of another whole.

In fact, you can change the improper fraction into a mixed number first. It is very easy to convert an improper fraction into a mixed number; it's just a simple division problem.

If you divide 8 into 11 you can see, $\frac{11}{8}$ is equivalent to $1\frac{3}{8}$. It doesn't matter if you change an improper fraction to a mixed number or if you leave it in improper form. It means the same thing, but it is important to understand it both ways.

Example:

- Convert $2\frac{5}{8}$ into a mixed number.

Solution:

- The denominator 8 tells you each whole has been divided into 8 parts. The number 2 tells you there are 2 wholes. Since each whole can be divided into 8 parts, you have 2(8) = 16 parts from the 2 wholes. The numerator of the fraction, 5, tells you there are an additional 5 pieces. You now have 16 + 5 = 21 total pieces.

- To express this as an improper fraction, write the total number of pieces (21) as the numerator and the number of pieces per whole (8) as the denominator. $\frac{21}{8}$

Notice that this is the same thing as multiplying the denominator by the whole number and then adding the numerator to get the new numerator. The denominator stays the same.

Sometimes improper fractions convert into whole numbers.

Example:

- Convert $\frac{12}{4}$ into a whole number.

Solution:

- This fraction says that you have twelve things being put into groups of four:

- There are twelve stars in the picture above. Now see how many groups of four you can make:

- You can see that there are three groups of four with nothing left over. This means that you can express $\frac{12}{4}$ as 3.

You can also convert mixed numbers into improper fractions. Multiply the whole number by the denominator and then add the numerator to the product. Finally, put the sum over the existing denominator. Take a look at the following problem to help you better understand this concept.

$$1\frac{3}{5}$$

$$= 1 \cdot 5 + 3$$

$$= 8$$

$$1\frac{3}{5} = \frac{8}{5}$$

Rounding Fractions

Now that you understand proper fractions, improper fractions, and mixed numbers, you can begin to use them to describe things. But first, it will also be helpful for you to understand how to round fractions. By knowing how to round fractions, you can estimate with them. (You will learn more about estimating fractions later.)

The first thing you need to determine when rounding fractions is if the fraction is closest to 0, $\frac{1}{2}$, or 1.

Remember, you can always draw a picture of the fraction to help you decide where best to round the fraction to.

Let's Review

Before moving on to the practice problems, make sure you can do each of the following:

- Identify proper fractions, improper fractions, and mixed numbers.
- Identify the numerator and the denominator of a fraction.
- Convert between improper fractions and mixed numbers.
- Round fractions and mixed numbers to the nearest number: 0, $\frac{1}{2}$, or 1.

Complete the following activities.

1.1 The number $\frac{5}{7}$ can be best described as a(n) _____.

- ☐ proper fraction
- ☐ improper fraction
- ☐ mixed number

1.2 Which fraction has a numerator of 9 and a denominator of 13?

- ☐ $\frac{13}{9}$
- ☐ $\frac{9}{13}$

1.3 Which number is equivalent to the fraction $\frac{15}{7}$?

- ☐ $\frac{7}{15}$
- ☐ $1\frac{2}{7}$
- ☐ 2
- ☐ $2\frac{1}{7}$

1.4 Which of the following most closely rounds to the number 1?

- ☐ $\frac{1}{3}$
- ☐ $\frac{3}{6}$
- ☐ $\frac{8}{9}$
- ☐ $\frac{6}{13}$

1.5 A mixed number can have the same value as an improper fraction.

- ○ True
- ○ False

1.6 Which group contains numbers that *all* round most closely to $\frac{1}{2}$?

- ☐ $\frac{1}{5}, \frac{2}{9}, \frac{4}{8}$
- ☐ $\frac{3}{5}, \frac{2}{4}, \frac{4}{7}$
- ☐ $\frac{3}{4}, \frac{5}{6}, \frac{7}{9}$
- ☐ $\frac{1}{2}, \frac{2}{7}, \frac{9}{10}$

1.7 Which number is equivalent to the fraction $\frac{14}{5}$?

- ☐ $2\frac{4}{5}$
- ☐ 2
- ☐ 3
- ☐ $1\frac{9}{5}$

1.8 Which of the following is an example of an improper fraction?

- ☐ 3
- ☐ $\frac{9}{5}$
- ☐ $\frac{5}{9}$
- ☐ $1\frac{1}{2}$

Complete the following problems in the space provided.

1.9 Convert $1\frac{2}{5}$ to an improper fraction.

1.10 Convert $4\frac{2}{7}$ to an improper fraction.

1.11 Convert $\frac{12}{5}$ to a mixed number.

1.12 Convert $\frac{9}{2}$ to a mixed number.

1.13 Convert $\frac{21}{8}$ to a mixed number.

Equivalent Fractions

Take a second and think about the words "hi" and "hello." One of the first things that may come to your mind is that they are two different words, but they mean the same thing. You can probably think of a few more examples of different words that mean the same thing. This also happens with fractions. You can have two different fractions that actually mean the same thing.

This lesson will help you understand how the same fraction can be written into other forms without changing its value.

Objectives

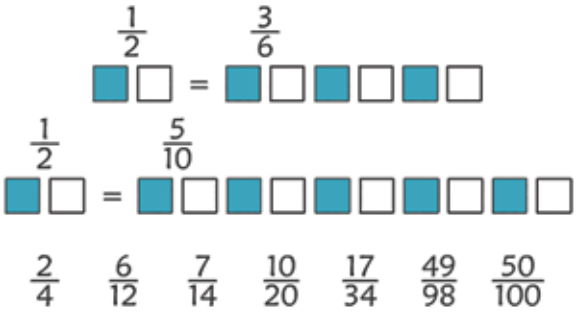
- Identify equivalent fractions.
- Identify fractions written in simplest form.

Vocabulary

equivalent fractions—fractions with the same numerical value; fractions that are equal to each other

simplest form—a fraction in lowest terms

When you have two different fractions that mean the same thing, they're called *equivalent fractions*. Take a look at some fractions that are equivalent to $\frac{1}{2}$.



Even though each of the fractions have different numerators and denominators, they are all equal to one-half of the whole.

An easy way to identify equivalent fractions is to multiply both the numerator and denominator by the same number. Go through this next example to better understand how this works.

Example:

- Find an equivalent fraction for $\frac{2}{3}$.

Solution:

- The first step is to determine a number to multiply both the numerator and the denominator by. Remember that it has to be the same number. Use the number 2:
- $\frac{2}{3} \cdot \frac{2}{2} = \frac{4}{6}$
- So $\frac{4}{6}$ is an equivalent fraction for $\frac{2}{3}$.

You can find multiple equivalent fractions for every fraction. Take a look at the following example of finding three equivalent fractions for the same fraction.

Self Test 1: Working with Fractions

Check the box of the correct answer for each question (5 points, each numbered activity)

1.01 The number $\frac{5}{3}$ can be best described as a(n) _____.

- ☐ proper fraction
- ☐ mixed number
- ☐ improper fraction

1.02 Which number is equivalent to the fraction $\frac{18}{5}$?

- ☐ $\frac{5}{18}$
- ☐ 3
- ☐ $3\frac{3}{5}$
- ☐ $2\frac{8}{5}$

1.03 The LCM of three numbers is 48. What are the numbers?

- ☐ 2, 3, 4
- ☐ 6, 16, 24
- ☐ 3, 8, 12
- ☐ 6, 8, 12

1.04 Which of the following rounds most closely to 1?

- ☐ $\frac{2}{3}$
- ☐ $\frac{4}{8}$
- ☐ $\frac{1}{5}$
- ☐ $\frac{4}{5}$

1.05 A proper fraction never has the same value as a mixed number.

- ☐ True
- ☐ False

1.06 Which group contains numbers that *all* round most closely to 0?

- ☐ $\frac{1}{5}, \frac{2}{9}, \frac{0}{4}$
- ☐ $\frac{3}{5}, \frac{2}{4}, \frac{4}{7}$
- ☐ $\frac{3}{4}, \frac{5}{6}, \frac{7}{9}$
- ☐ $\frac{1}{2}, \frac{2}{7}, \frac{9}{10}$

1.07 Which of the following is an example of a proper fraction?

- ☐ 3
- ☐ $\frac{9}{5}$
- ☐ $\frac{5}{9}$
- ☐ $1\frac{1}{2}$

1.08 The GCF of the numerator and denominator in $\frac{15}{24}$ is _____.

- ☐ 2
- ☐ 3
- ☐ 5
- ☐ 8

1.09 Both the numerator and the denominator of $\frac{21}{24}$ can be divided by _____.

- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 6

1.010 The following is the prime factorization of which composite number? $2^2 \cdot 3^2 \cdot 5$

☐ 20 ☐ 60 ☐ 120 ☐ 180

1.011 Match these items to the choices below.

_____ a number to be multiplied
_____ 5
_____ 6
_____ greatest common factor
_____ least common multiple

GCF
factor
LCM
composite number
prime number

1.012 The number 420 is divisible by all of the following *except* _____.

☐ 3 ☐ 9 ☐ 12 ☐ 30

1.013 A composite number can be written as the product of prime numbers.

☐ True ☐ False

1.014 The number with a prime factorization of 3^4 is _____.

☐ 6 ☐ 12 ☐ 81 ☐ 243

1.015 The LCM of 15 and 30 is _____.

☐ 1 ☐ 15 ☐ 30 ☐ 45

1.016 The GCF of 64 and a number is 16. Which of the following could be the number?

☐ 16 ☐ 24 ☐ 28 ☐ 36

Complete each Activity (5 points, each numbered activity)

1.017 Write an equivalent fraction for $\frac{12}{16}$ in simplest form.

1.018 Convert $3\frac{4}{7}$ to an improper fraction.

1.019 Convert $\frac{32}{5}$ to a mixed number.

1.020 Find the GCF of 24 and 27.

1.021 Find the LCM of 9 and 15.

84/105 **SCORE** _____ **TEACHER** _____ _____
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