

Section 4.2

TERMINOLOGY

4.2

For each of the following terms, provide 1) a definition in your own words, 2) the formal definition (as provided by your text or instructor), and 3) an example of the term using a drawing or problem. A sample filled-out form is available in the Introduction.

Fraction

Your definition	
Formal definition	
Example	

Numerator

Your definition	
Formal definition	
Example	

Denominator

Your definition	
Formal definition	
Example	

Proper Fraction

Your definition	
Formal definition	
Example	

Improper Fraction

Your definition	
Formal definition	
Example	

Mixed Number

Your definition	
Formal definition	
Example	

READING AND SELF-DISCOVERY QUESTIONS

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1. In your own words, what does a fraction represent?

A fraction represents a number. It is made up of the denominator, which tells you how many pieces are needed to make a whole, and a numerator, which tells you how many parts there are.

2. What are the parts of a fraction called?

The two numbers in a fraction are called the numerator and the denominator. The numerator is the number of equal parts, the denominator indicates how large each part is.

3. Which mathematical operation is indicated by the fraction bar?

Division is indicated by the fraction bar or vinculum.

4. What is the quotient when a number is divided by itself?

When a number is divided by itself, the quotient is 1 (except when the number is zero).

5. What is the quotient when a number is divided by 0?

The quotient is undefined.

6. What is the quotient when 0 is divided by any number?

The quotient is 0 when 0 is divided by any number except 0.

7. What process do you use for changing an improper fraction into a mixed number?

Divide the numerator by the denominator. The quotient is the whole number part of the mixed number. The remainder from the division is the numerator of the fraction. The denominator stays the same.

8. What process do you use for changing a mixed number to an improper fraction?

Multiply the integer by the denominator of the fraction and add the numerator of the fraction to the result. Present the number as this result divided by the denominator of the fraction.

CRITICAL THINKING QUESTIONS

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1. Draw a picture to explain why the procedure of changing a mixed number to an improper fraction works.

$$1\frac{3}{4} = 1 + \frac{3}{4}$$
$$\frac{7}{4} = \frac{4}{4} + \frac{3}{4}$$

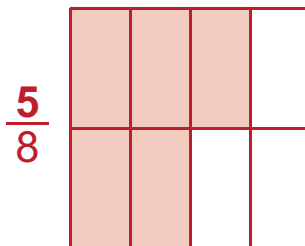
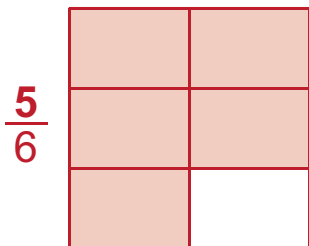
2. How can a fraction be used to relate a part to a whole? Provide an example.

Answers will vary. Here is a sample answer: $\frac{2}{5}$ can mean 2 parts of the whole of 5 parts. So $\frac{2}{5}$ of a dollar is 40 cents. There are 5 parts of equal size in a dollar, namely, 20 cents. 2 of these parts is 40 cents.

3. Why is it sometimes preferable to work with an improper fraction instead of a mixed number? Give an example.

In multiplying numbers together it is often easier to work with a improper fraction. For example, $2\frac{1}{4} \times 3\frac{1}{2}$ is less easy to multiply than $\frac{9}{4} \times \frac{7}{2}$. In the second example, the result is immediately obvious as $\frac{63}{8}$. In the first example, we have to calculate $(2 + \frac{1}{4}) \times (3 + \frac{1}{2})$ using the Distributive Property.

4. Using pictures, compare two fractions with the **same** numerator but **different** denominators.



This is just a sample answer; student answers will vary.

DEMONSTRATE YOUR UNDERSTANDING

4.2

1. Represent $3\frac{2}{7}$ graphically (draw a model).

Student answers will vary.

2. Determine which fraction is larger in each set. Circle the larger fraction.

a) $\frac{1}{3}$ or $\frac{1}{4}$

b) $\frac{1}{5}$ or $\frac{3}{5}$

c) $\frac{3}{4}$ or $\frac{3}{8}$

d) $\frac{12}{4}$ or $\frac{12}{3}$

IDENTIFY AND CORRECT THE ERRORS

4.2

In the second column, identify the error(s) you find in the following worked solution and describe the error made. Solve the problem correctly in the third column.

Problem	Describe Error	Correct Process
Which fraction is larger: $\frac{1}{6}$ or $\frac{1}{8}$	<p>The student has failed to understand that the denominator of a fraction is an expression of how many total number of equal parts there are in a whole.</p>	<p>Students may use different methods. A correct answer is one that distinguishes one in six parts of a whole from one in eight parts of a whole. The whole (1 or 6/6 or 8/8) should be the same shape/population/thing for both, lest the student compare actual sizes of different shapes/populations/things.</p>
Worked Solution (What is wrong here?)		
<p>$\frac{1}{8}$ is larger because 8 is larger than 6.</p>		