Section 4.3

TERMINOLOGY 4.3

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.

Equivalent Fractions

Your definition	
Formal definition	
Example	

Lowest Terms Fraction

Your definition	
Formal definition	
Example	

READING AND SELF-DISCOVERY QUESTIONS 4.3

1. What is true about the values of equivalent fractions?

   Two equivalent fractions represent the same number.

2. What process do you use for finding equivalent fractions for any given fraction?

   Multiply the numerator and the denominator by the same number.

3. What does the Identity Property of One have to do with creating equivalent fractions?

When you multiply the numerator and denominator by the same number, it is the same as multiplying the fraction by a number divided by itself. Thus, this operation is the same as multiplying the original fraction by 1 which does not change the value of the fraction. Of course, we are excluding multiplying the numerator and the denominator by zero divided by zero.

4. How do you know when a fraction has been reduced to its lowest terms?

You know that a fraction has been reduced to lowest terms if, when you write the numerator and denominator in prime factored form, there are no common prime numbers in the factorizations.

5. Is the process for simplifying fractions which have variables the same as the process used for simplifying fractions that have only constants?

Yes

CRITICAL THINKING QUESTIONS 4.3

1. Why is it important to be able to express a fraction in lowest terms?

When you display a fraction in lowest terms, it is easier to compare fractions. Also, if two fractions are expressed in lowest terms, then it is easy to see if they represent the same number.

2. List three ways you use fractions in your daily life.

Answers will vary and could include cooking, in measuring using a ruler, and in talking about free throw performance in basketball. Examples:
half of a cup, 2 and a half feet, or making three fifths (3/5) of her free throws.

3. Why, when you divide by zero, is the result undefined?

In the takeaway model of division, how many times can you take 0 away from a number? In an algebraic model of division p/q means p=qt. If q is 0, then p=q*0 and p must be zero which is false. So, we cannot define p/0.

4. How can you verify that two fractions are equivalent?

You can verify that two fractions are equivalent by reducing each fraction to its lowest form and checking to see if these reduced forms are the same.

DEMONSTRATE YOUR UNDERSTANDING 4.3

1. Create five equivalent fractions for each of the following:

a) $\frac{2}{3}$ _____ _____ _____ _____ _____ b) $\frac{3}{5}$ _____ _____ _____ _____ _____

Answers will vary.

IDENTIFY AND CORRECT THE ERRORS 4.3

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

Problem	Describe Error	Correct Process
Simplify: $\frac{100}{8}$ **Worked Solution** *(What is wrong here?)* $\frac{100}{8}=\frac{25\cdot 2\cdot 2}{2\cdot 2\cdot 2}$ $=\frac{25\cdot {}^{1}\cancel{2}\cdot {}^{1}\cancel{2}}{{}^{1}\cancel{2}\cdot {}^{1}\cancel{2}\cdot {}^{1}\cancel{2}}=\mathbf{25}$	**The student has zealously cancelled one too many of the 2's in the denominator. The 'cancelling' is paired in the numerator and denominator and the '1' notation shows that for each pair that is cancelled, what is left is 1/1 or 1. Cancelling is "finding ones", or finding values like 2/2 that simplify to one. There are only two "ones" in 100/8.**	$\frac{100}{8}=\frac{25\cdot 2\cdot 2}{2\cdot 2\cdot 2}$ $=\frac{25\cdot {}^{1}\cancel{2}\cdot {}^{1}\cancel{2}}{2\cdot {}^{1}\cancel{2}\cdot {}^{1}\cancel{2}}=\mathbf{\frac{25}{2}}$