Section 5.3

TERMINOLOGY 5.3

For the following term, 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.

Least Common Denominator

Your definition	
Formal definition	
Example	

READING AND SELF-DISCOVERY QUESTIONS 5.3

1. What process do you use for adding or subtracting algebraic expressions that contain fractions with **the same denominator**?

   Add the numerators, put them over the common denominator, and then simplify.

2. How does the process for adding or subtracting algebraic expressions that contain fractions change when those fractions have **different denominators**?

   Multiply each fraction by the "one" that produces a common denominator.

CRITICAL THINKING QUESTIONS 5.3

1. What is the relationship between a Least Common Multiple and the Least Common Denominator of two fractions?

   The least common multiple of the denominators is used to produce the least common denominator.

2. Why is 1 the denominator of any whole number that has been converted into fractional form?

   A whole number divided by one is the whole number. This allows us to set up the whole number in a fractional form without changing its equivalence.

3. How does the process of finding the LCD when adding three fractions differ from the process of finding the LCD when adding two fractions?

We need to find the common factors for all three denominators

DEMONSTRATE YOUR UNDERSTANDING 5.3

1. Supply the missing information for each equation.

a) $\frac{x}{?}+\frac{3}{10}=\frac{2x+3}{10}$? = **5**

b) $\frac{4n}{7}-\frac{?}{21}=\frac{8n}{21}$? = **4n**

2. What whole number is closest to $\frac{12}{13}+\frac{7}{8}$? Explain your reasoning.

It's closest to 2, because 12/13 is greater than 1/2, and 7/8 is also greater than 1/2. This means that the solution cannot be any less than 1. To tell if the solution is closer to 1 or 2, you must find the common denominator, add the numerators together and place them over that denominator: $\frac{12}{13}+\frac{7}{8}=\frac{96}{104}+\frac{91}{104}=\frac{187}{104}=1\frac{83}{104}$

83 is more than 52 (half of 104), so the answer is closer to 2 than 1.

IDENTIFY AND CORRECT THE ERRORS 5.3

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

Problem	Describe Error	Correct Process
1. Perform the indicated operation: $\frac{5}{x}+\frac{2}{x}$	**The student has failed to understand how to identify and/or create the least common denominator and simply added the denominators.**	$\frac{5}{x}+\frac{2}{x}=\frac{5+2}{x}=\frac{7}{x}$
Worked Solution *(What is wrong here?)*	**Because both fractions have the same denominator, that denominator is already the LCD and will be the denominator of their sum.**	
$\frac{5}{x}+\frac{2}{x}=\frac{7}{2x}$		

Problem	Describe Error	Correct Process
2. Perform the indicated operation: $\frac{7}{x}-\frac{2}{y}$	**The student went a few steps too far, forgetting that you can only cancel common *factors* in a fraction.**	$LCD = xy$ $\frac{7\bullet y}{x\bullet y}=\frac{7y}{xy}$ and $\frac{2\bullet x}{y\bullet x}=\frac{2x}{xy}$ $=\frac{7y-2x}{xy}$

Worked Solution
(What is wrong here?)

$LCD = xy$

$\frac{7\bullet y}{x\bullet y}=\frac{7y}{xy}$ and $\frac{2\bullet x}{y\bullet x}=\frac{2x}{xy}$

$\frac{7y-2x}{xy}=\frac{7\cancel{y}^{1}-2\cancel{x}^{1}}{\cancel{x}^{1}\cancel{y}^{1}}$

$=\frac{7-2}{1}=\frac{5}{1}=\mathbf{5}$