3.5 Addition and Subtraction with Fractions

1. Addition and Subtraction When the Denominators Are the Same: To add or subtract fractions that have the same denominator, add or subtract the numerators to get the numerator of the answer and carry along the common denominator to get the denominator of the answer.

Example: Simplify the following.

a. $\dfrac{3}{8} + \dfrac{5}{8} = \dfrac{8}{8} = 1$

b. $\dfrac{4}{11} + \dfrac{5}{11}$

c. $\dfrac{5}{13} + \dfrac{8}{13}$

2. Addition and Subtraction When the Denominators Are Not the Same: To add or subtract fractions that do not have the same denominator:
- Find the least common denominator (LCD).
- Rewrite the fractions as equivalent fractions that have the LCD as their denominator.
- Add or subtract the numerators to get the numerator of the answer and carry along the common denominator to get the denominator of the answer.

NOTE: On tests, when adding or subtracting fractions, you must rewrite the fractions as equivalent fractions that have the least common denominator. This step is worth points, and to get the points your denominator must be the **least** common denominator.

Note: Portions of this document are excerpted from the textbook *Prealgebra,* 7th ed. by Charles McKeague

Example: Simplify the following.

a. $\dfrac{3}{4} + \dfrac{1}{2} = \dfrac{?}{4} + \dfrac{?}{4}$ the LCD is 4

$= \dfrac{3}{4} + \dfrac{2}{4}$ rewrite using the LCD and adjusting the numerators

$= \dfrac{5}{4}$ add the numerators and carry along the LCD

b. $\dfrac{1}{14} + \dfrac{2}{21}$

c. $\dfrac{3}{10} + \dfrac{8}{15}$

d. $\dfrac{5}{12} + \dfrac{7}{30}$

3. Addition and Subtraction If the Fractions Have Different Denominators and You Don't Know the Least Common Denominator (LCD): To "build" the least common denominator, prime factor each denominator, and give each denominator (and numerator) the factors that it is missing from the other denominator.

Example: Simplify the following.

a. $\dfrac{5}{36} + \dfrac{7}{50} = \dfrac{5}{2 \bullet 2 \bullet 3 \bullet 3} + \dfrac{7}{2 \bullet 5 \bullet 5}$

$= \dfrac{5}{2 \bullet 2 \bullet 3 \bullet 3} \bullet \dfrac{5 \bullet 5}{5 \bullet 5} + \dfrac{7}{2 \bullet 5 \bullet 5} \bullet \dfrac{2 \bullet 3 \bullet 3}{2 \bullet 3 \bullet 3}$

$= \dfrac{125}{900} + \dfrac{126}{900}$

$= \dfrac{251}{900}$

b. $\dfrac{4}{15} + \dfrac{2}{27}$

c. $\dfrac{20}{51} - \dfrac{7}{36}$

d. $\dfrac{7}{54} + \dfrac{11}{90}$

e. $\dfrac{8}{35} - \dfrac{6}{49}$