Working with Fractions

ADDITION AND SUBTRACTION OF FRACTIONS

For fractions having the **same denominator**:
a. Add or subtract the numerators.
b. Keep the same denominator.

For fractions having **different denominators**:
a. Convert to equivalent fractions having their LCD.
b. Add or subtract the numerators of the new fractions.
c. Keep the LCD as the denominator.

For problems involving **mixed numerals**:
a. Add or subtract the fraction parts of the numbers, as above.
If you need to borrow:
a. Subtract one from the whole number part of the top number.
b. Add 1 (i.e., $\frac{3}{3}$) to the fraction part of the top number.
c. Continue with the problem.
b. Add or subtract the whole numbers in the problem.
c. Add the two results at the end.

Example 1:

$$\frac{1}{6} + \frac{3}{6} = \frac{4}{6} = \frac{2}{3}$$

Example 2:

$$\begin{array}{r} \frac{3}{4} = \frac{6}{8} \\ +\ \frac{5}{8} = \frac{5}{8} \\ \hline \frac{11}{8} = 1\frac{3}{8} \end{array}$$

Example 3:

$$\begin{array}{r} 3\frac{1}{3} = 3\frac{5}{15} = 2\frac{20}{15} \\ -1\frac{2}{5} = 1\frac{6}{15} = 1\frac{6}{15} \\ \hline 1\frac{14}{15} \end{array}$$

MULTIPLICATION OF FRACTIONS

To multiply a fraction by a **whole number**:
a. Multiply the numerator by the whole number.
b. Write the result over the denominator.

To multiply a fraction by **another fraction**:
a. Multiply the numerators.
b. Multiply the denominators.

When a multiplication problem involves a **mixed numeral**, convert it to an improper fraction* first.

Example 4:

$$\frac{3}{5} \times 8 = \frac{24}{5} = 4\frac{4}{5}$$

Example 5:

$$\frac{1}{2} \times \frac{7}{8} = \frac{7}{16}$$

DIVISION OF FRACTIONS

To divide with fractions, or fractions and whole numbers:
a. Invert the divisor. Remember that whole numbers can be written as fractions over 1.
b. Multiply the fractions.

Example 6:

$$\frac{4}{9} \div \frac{5}{6} = \frac{4}{9} \times \frac{6}{5} = \frac{24}{45} = \frac{8}{15}$$

Example 7:

$$\frac{2}{3} \div 8 = \frac{2}{3} \times \frac{1}{8} = \frac{2}{24} = \frac{1}{12}$$

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