

Summary of fraction notation conversion and operations using fractions

Definitions with examples:

Numerator: top number in a fraction

Denominator: bottom number in a fraction

Mixed fraction: *whole* $\frac{top}{bottom}$; example: $3\frac{2}{5}$

Improper fraction: top number greater than bottom number; example: $\frac{9}{5}$

Common factor: A common factor is a number that can be divided into two different numbers. Example: $\frac{16}{32}$; has a few common factors 2, 4, 8, 16

Lowest terms: the top and bottom of a fraction no longer have no common factor; example: $\frac{16}{32} = \frac{1}{16}$

Equivalent fraction: two fractions are said to be equivalent when there is a common factor. Example: $\frac{3}{8} = \frac{12}{32}$; there is a common factor of "4"

BEDMAS: order of operations; example: $3(2 + 6)^2 = 3(8)^2 = 3(64) = 192$

Converting:

Mixed to Improper Fractions

$$whole \frac{top}{bottom} = \frac{(whole \times bottom) + top}{bottom}$$

$$\text{Example: } 3\frac{2}{5} = \frac{(3 \times 5) + 2}{5} = \frac{17}{5}$$

Improper to Mixed

*We need to use long division

$\frac{\text{top}}{\text{bottom}}$; *how many times does the bottom go into the top*

Example: $\frac{9}{5}$

$$\begin{array}{r}
 1 \\
 5 \overline{) 9} \\
 \underline{- 5} \\
 4
 \end{array}$$

$$= 1\frac{4}{5}$$

Operations with fractions

Steps for Adding and Subtracting

- Needs a common denominator
- Don't need to convert to improper fractions, but one can
- Add or subtract the numerators while keeping the denominators the same
- *If adding*, you may need to convert an improper fraction to a mixed number, and carry forward to the existing whole number in front
- *If subtracting*, you may need to borrow from one of the whole numbers in front to make the first numerator bigger
- Simplify to lowest terms

Example: $\frac{3}{5} + \frac{2}{7} = \frac{21}{35} + \frac{10}{35} = \frac{31}{35} = 1 \frac{4}{35}$

Example: $3 \frac{4}{7} - \frac{8}{7} = 2 \frac{11}{7} - \frac{8}{7} = 2 \frac{3}{7}$

Steps for Multiplying

- No common denominator needed
- Need to convert mixed fractions to improper fractions
- Multiply top by top and bottom by bottom
- Simplify to lowest terms

Example: $\frac{3}{5} \times \frac{2}{7} = \frac{6}{35}$

Example: $3 \frac{4}{7} \times 2 \frac{8}{9} = \frac{25}{7} \times \frac{22}{9} = \frac{550}{63} = 8 \frac{46}{63}$

Steps for Dividing

- No common denominator needed
- Need to convert mixed fractions to improper fractions
- Invert the second fraction and change to multiplication
- Multiply top by top and bottom by bottom
- Simplify to lowest terms

Example: $\frac{3}{5} \div \frac{2}{7} = \frac{3}{5} \times \frac{7}{2} = \frac{21}{10} = 2\frac{1}{10}$

Example: $2\frac{4}{7} \div 1\frac{8}{7} = \frac{18}{7} \div \frac{15}{7} = \frac{18}{7} \times \frac{7}{15} = \frac{126}{105} = \frac{6}{5} = 1\frac{1}{5}$

In all cases, make sure your answer is in **lowest terms!**

Also note that in questions with multiple operations, the rules of BEDMAS still apply as usual.

For practice, please visit SALS ONLINE- Math in DC Connect