

Combining Fractions – Part 2

Finding the Least Common Multiple

List the first few multiples of the larger number. Then find the first multiple that is divisible by the smaller number.

Example

$$\frac{1}{3} + \frac{1}{4} \quad 4, 8, \underset{\uparrow}{12}, 16, \dots \leftarrow \text{multiples of } 4$$

First multiple divisible by 3 ($12 \div 3 = 4$)

The least common multiplier (LCM) of 3 and 4 is 12

Adding Unlike Fractions

Step 1 – Find the least common multiple (LCM) which would be 10 for the following example

Step 2 – Rewrite the fractions with the least common multiple as the denominator by multiplying each fraction by the factor that gets the denominator of that fraction equal to the LCM.

Step 3 – Add the numerators, place the sum over the common denominator, and simplify the answer

Example

$$\frac{1}{2} + \frac{1}{5} + \frac{1}{10} \qquad \text{LCM of 2, 5, and 10} = 10$$

$$\frac{1}{2} = \frac{1 \times 5}{2 \times 5} = \frac{5}{10}$$

$$\frac{1}{5} = \frac{1 \times 2}{5 \times 2} = \frac{2}{10}$$

$$\frac{1}{10} = \frac{1 \times 1}{10 \times 1} = \frac{1}{10}$$

$$= \frac{5}{10} + \frac{2}{10} + \frac{1}{10} = \frac{8}{10} = \frac{4}{5}$$

Subtracting Unlike Fractions

Step 1 – Find the least common multiple (LCM)

Step 2 – Rewrite the fractions with the least common multiple as the denominator

Step 3 – Subtract the numerators, place the difference over the common denominator, and simplify the answer

Example

$$\frac{5}{6} - \frac{1}{4} \qquad \text{LCM of 6 and 4} = 12$$

$$\frac{5}{6} \times \frac{2}{2} = \frac{10}{12} \quad \frac{1}{4} \times \frac{3}{3} = \frac{3}{12}$$

$$\frac{10}{12} - \frac{3}{12} = \frac{7}{12}$$

Adding Mixed Numbers

Step 1 – Add the fractions, using the lowest common denominator (same as the LCM) which happens to be 12

Step 2 – Add the whole numbers (4 + 6) which results to 10

Step 3 – Combine and simplify.

Example

$$4\frac{1}{3} + 6\frac{2}{4} \quad \text{LCM of 3 and 4 is 12}$$

$$= 4\frac{4}{12} + 6\frac{6}{12}$$

$$= 10\frac{10 \div 2}{12 \div 2} \rightarrow 10\frac{5}{6}$$

Subtracting Mixed Numbers

Step 1 – Subtract the fractions, using the lowest common denominator (same as the LCM).

Step 2 – Subtract the whole numbers (6 – 3 = 3)

Step 3 – Combine the differences of the whole numbers and the fractions and simplify.

Example

$$6\frac{1}{2} - 3\frac{1}{4}$$

$$6\frac{2}{4} - 3\frac{1}{4}$$

$$3\frac{1}{4}$$

Using Order of Operations with Fractions

Step 1 – Do all operations inside the parentheses first

Step 2 – Simplify any expressions with exponents and find any square roots

Step 3 – Multiply or divide, proceeding from left to right

Step 4 – Add or subtract, proceeding from left to right

Example

$$\begin{aligned} & \frac{1}{2} \left(\frac{2}{3} \right) - \left(\frac{1}{4} \right)^2 \\ &= \frac{2}{6} - \frac{1}{16} \\ &= \frac{1}{3} - \frac{1}{16} \\ &= \frac{16}{48} - \frac{3}{48} \\ &= \frac{13}{48} \end{aligned}$$