Fix Those Fractions!! Self-Help Guide!

Adding Fractions

If one half of a pie is added to the other half of that same pie, what would be the result? The answer is obviously the whole pie. Therefore $\frac{1}{2} + \frac{1}{2} = 1$. If $\frac{1}{2}$ was added to $\frac{1}{4}$, could the answer be $\frac{2}{6}$ (which is equal to $\frac{1}{3}$) which is less than $\frac{1}{2}$? Definitely not! The process used to combine fractions should produce a reasonable answer.

Addition requires "like terms" which means like denominators or common denominators.

If denominators are alike, combine the numerators. Simplify if necessary.

Example #18: $\mathbf{\frac{2}{5} + \frac{1}{5}}$

Combine the numerators: $\frac{2+1}{5} = \frac{3}{5}$

Example #19: $\mathbf{\frac{3}{8} + \frac{1}{8}}$

Combine the numerators: $\frac{3+1}{8} = \frac{4}{8}$

Simplify (divide by the GCF): $\frac{4}{8} \div \frac{4}{4} = \frac{4 \div 4}{8 \div 4} = \frac{1}{2}$

If the denominators are different, first produce common denominators. To find the least common denominator (LCD), find the ***least common multiple*** (LCM) which is the smallest number that is a multiple of both numbers.

Example #20: $\mathbf{\frac{1}{2} + \frac{1}{3}}$

Find the LCM (list multiples if necessary):
Multiples of 2: 2, 4, 6, 8, …
Multiples of 3: 3, 6, 9, …

Multiply by a form of 1 ($\frac{3}{3}$ and $\frac{2}{2}$) to produce the LCD: $\frac{1}{2} \bullet \frac{3}{3} + \frac{1}{3} \bullet \frac{2}{2} = \frac{1 \bullet 3}{2 \bullet 3} + \frac{1 \bullet 2}{3 \bullet 2}$

Combine the numerators: $\frac{3}{6} + \frac{2}{6} = \frac{3+2}{6} = \frac{5}{6}$

For more information on equivalent fractions, see Example 12 on page 14.

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Adding Fractions (continued)

Example #21: $\mathbf{\frac{3}{4} + \frac{5}{6}}$

Find the LCM (list multiples if necessary):
Multiples of 4: 4, 8, 12, …
Multiples of 6: 6, 12, 18, …

Multiply by a form of 1 ($\frac{3}{3}$ and $\frac{2}{2}$) to produce the LCD:

$$\frac{3}{4}\cdot\frac{3}{3} + \frac{5}{6}\cdot\frac{2}{2} = \frac{3\cdot 3}{4\cdot 3} + \frac{5\cdot 2}{6\cdot 2}$$

Combine the numerators:

$$\frac{9}{12} + \frac{10}{12} = \frac{9+10}{12} = \frac{19}{12}$$

Note: $\frac{19}{12}$ is an improper fraction. It is simplified because there are no common factors between the numerator and denominator. It can be changed to a mixed number if preferred.

Example #22: $\mathbf{8 + \frac{5}{6}}$

Place the whole number over 1:

$$\frac{8}{1} + \frac{5}{6}$$

Find the LCM (list multiples if necessary):
Multiples of 1: 1, 2, 3, 4, 5, 6, …
Multiples of 6: 6, 12, …

Multiply by a form of 1 ($\frac{6}{6}$) to produce the LCD:

$$\frac{8}{1}\cdot\frac{6}{6} + \frac{5}{6} = \frac{8\cdot 6}{1\cdot 6} + \frac{5}{6}$$

Combine the numerators:

$$\frac{48}{6} + \frac{5}{6} = \frac{48+5}{6} = \frac{53}{6}$$

Note: $\frac{53}{6}$ is an improper fraction. It is simplified because there are no common factors between the numerator and denominator. It can be changed to a mixed number if preferred.