

U1D4-T Adding and Subtracting Rationals

Sunday, January 28, 2018 3:57 PM



U1D4-T
Adding an...

MPM1DI U1D4

Adding and Subtracting Rational Numbers

From last day's Homework:

$$\begin{aligned} & \left(-1\frac{3}{4}\right) \div \left(-1\frac{1}{5}\right) \div \left(-\frac{5}{9}\right) \\ &= -\frac{7}{4} \div \left(-\frac{6}{5}\right) \div \left(-\frac{5}{9}\right) \\ &= \frac{7}{4} \times \left(\frac{-5}{6}\right) \times \left(\frac{-9}{5}\right)^{-3} \\ &= -\frac{21}{8} \end{aligned}$$

Lowest Common Denominator

Example 1: Determine the LCD for each of the following:

a) $\frac{1}{3}, \frac{1}{4}$

prime ← 3
 ← 2
 ← 2
 composite ← 4

LCD 12

b) $\frac{2}{5}, \frac{3}{8}$

prime ← 5
 ← 4
 ← 2
 ← 2
 ← 2
 prime factors of 8

LCD 40

c) $\frac{1}{10}, \frac{1}{12}$

← 2
 ← 5
 ← 2
 ← 6
 ← 2
 ← 3

LCD $2 \times 5 \times 2 \times 3$
 = 60

d) $\frac{1}{2}, \frac{1}{4}, \frac{1}{7}$

← 2
 ← 2
 ← 7

LCD 28

Adding and Subtracting Fractions

** Remember fractions can only be added or subtracted if they have a COMMON

DENOMINATOR .

When Adding or Subtracting Fractions:

1. Change Mixed Fractions to Improper Fractions
2. Find the LCD
(lowest common denominator)
3. Get appropriate numerators to go with the LCD
For each fraction, determine what value the old denominator is multiplied by to get the LCD, then multiply the old numerator by that value.
4. Add/subtract the numerators keeping the LCD in the denominator
5. Reduce to lowest terms.

Examples: Evaluate each expression. Write your answer in lowest terms:

$$\text{a) } \frac{2}{3} + \frac{1}{4}$$

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

$$= \frac{8 + 3}{12}$$

$$= \frac{11}{12}$$

$$\text{b) } \frac{3}{8} + \frac{3}{4} \quad \text{LCD } 8$$

$$= \frac{3}{8} + \frac{3 \times 2}{4 \times 2}$$

$$= \frac{3 + 6}{8}$$

$$= \frac{9}{8}$$

$$\text{c) } 2\frac{1}{7} + 1\frac{1}{2}$$

$$= \frac{15}{7} + \frac{3}{2} \quad \text{LCD } 14$$

$$= \frac{15 \times 2}{7 \times 2} + \frac{3 \times 2}{2 \times 2}$$

$$= \frac{30 + 21}{14}$$

$$= \frac{51}{14}$$

$$\text{d) } \frac{5}{6} - \frac{3}{8} \quad \text{LCD } 2 \times 3 \times 2 \times 2 = 24$$

$$= \frac{5 \times 4}{6 \times 4} - \frac{3 \times 3}{8 \times 3}$$

$$= \frac{20 - 9}{24}$$

$$= \frac{11}{24}$$

$$\begin{aligned}
 \text{e) } & 3\frac{2}{5} - 1\frac{3}{4} \\
 & = \frac{17}{5} - \frac{7}{4} \quad \text{LCD } 20 \\
 & = \frac{68-35}{20} \\
 & = \frac{33}{20}
 \end{aligned}$$

$$\begin{aligned}
 \text{f) } & \left(1\frac{1}{4}\right) + \left(-\frac{3}{2}\right) - \left(2\frac{2}{5}\right) \\
 & = \frac{5}{4} - \frac{3}{2} - \frac{12}{5} \quad \text{LCD } 20 \\
 & = \frac{5 \times 5 - 3 \times 10 - 12 \times 4}{20} \\
 & = \frac{25 - 30 - 48}{20} \quad \begin{array}{r} -78 \\ 25 \\ \hline -53 \end{array} \\
 & = -\frac{53}{20}
 \end{aligned}$$

Don't forget about... BEDMAS

$$g) \frac{2}{3} \times \frac{5}{4} + \frac{3}{2}$$

$$= \frac{5}{6} + \frac{3}{2} \quad \text{LCD } 6$$

$$= \frac{5 + 3 \times 3}{6}$$

$$= \frac{5 + 9}{6} = \frac{14}{6} = \frac{7}{3}$$

$$h) \frac{2}{3} \times \left(\frac{5}{4} + \frac{3}{2} \right)^2$$

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

$$= \frac{2}{3} \times \frac{11}{2}$$

$$= \frac{11}{3}$$

$$i) 2 - \frac{7}{8} \div \frac{3}{4}$$

$$= \frac{2}{1} - \frac{7}{8} \times \frac{4}{3}$$

$$= \frac{2}{1} - \frac{7}{6}$$

$$= \frac{12-7}{6}$$

LCD 6

$$= \frac{5}{6}$$

$$j) \frac{3}{7} + \frac{-2}{3} \times \frac{3}{5} \div \frac{4}{5}$$

$$= \frac{3}{7} - \frac{2}{5} \times \frac{5}{4}$$

$$= \frac{3}{7} - \frac{1}{2}$$

$$= \frac{6-7}{14}$$

$$= -\frac{1}{14}$$