Fraction XII
Subtracting Unlike Denominators

By Monica Yuskaitis

Common Multiple

- A number that is a multiple of two or more numbers.

Some multiples of 4 & 6

12, 24, 36

Least Common Multiple

- The smallest common multiple of a set of two or more numbers.

8 = 8, 16, 24, 32, 40, 48

6 = 6, 12, 18, 24, 30, 36

Shortcut for Finding the Least Common Denominator or Least Common Multiple

Check to see if the smaller denominator divides evenly into the larger denominator. If it does, use the larger denominator for your LCD or LCM.

$$\frac{1}{3}$$
$$-\frac{1}{9}$$

3 will divide evenly into 9, so 9 is your LCD or LCM.

To Subtract Fractions With Unlike Denominators

- Find the multiples of each denominator.

$$\frac{1}{5} = 5, 10, 15, 20, 25, 30$$

$$-\frac{1}{10} = 10, 20, 30, 40, 50$$

To Subtract Fractions With Unlike Denominators

- Compare the lists of multiples. Circle the common multiples between the two lists.

$$\frac{1}{5} = 5, \boxed{10}, 15, \boxed{20}, 25, \boxed{30}$$

$$-\frac{1}{10} = \boxed{10}, \boxed{20}, \boxed{30}, 40, 50$$

To Subtract Fractions With Unlike Denominators

- Use the lowest common multiple as the denominator.

$$\frac{1}{5} = 5, \boxed{10}, 15, 20, 25, 30$$

$$- \frac{1}{10} = \boxed{10}, 20, 30, 40, 50$$

To Subtract Fractions With Unlike Denominators

■ This number is also called the least common denominator.

$$\frac{1}{5} = 5, \boxed{10}, 15, 20, 25, 30$$

$$-\frac{1}{10} = \boxed{10}, 20, 30, 40, 50$$

To Subtract Fractions With Unlike Denominators

■   Rewrite the fractions using the least common denominator or least common multiple.

$$\frac{1}{5} \qquad \frac{}{10}$$

$$-\frac{1}{10} \qquad \frac{}{10}$$

To Subtract Fractions With Unlike Denominators

- Find the equivalent fractions for 1/5 & 1/10 with 10 as the denominator.

$$\frac{1}{5}$$
$$-\frac{1}{10}$$

$$\frac{}{10}$$
$$\frac{1}{10}$$

You know that 1/10 is equal to 1/10 so Put a 1 over the Bottom 10.

To Subtract Fractions With Unlike Denominators

- Find the equivalent fractions for 1/5 & 1/10 with 10 as the denominator.

$$\frac{1}{5}$$
$$-\frac{1}{10}$$

$$\frac{}{10}$$
$$\frac{1}{10}$$

To find the top number, ask yourself what do you multiply the 5 by to get 10.

To Subtract Fractions With Unlike Denominators

- Find the equivalent fractions for 1/5 & 1/10 with 10 as the denominator.

$$\frac{1 \text{ x } 2}{5 \text{ x } 2} = \frac{}{10}$$

$$\frac{1}{10}$$

$$- \frac{1}{10}$$

That's right 2. Since you are looking for the equivalent fraction you know the top number must also be multiplied by 2.

To Subtract Fractions With Unlike Denominators

■ Find the equivalent fractions for 1/5 & 1/10 with 10 as the denominator.

$$\frac{1 \text{ x } 2 = 2}{5 \text{ x } 2 = 10}$$

$$\frac{1}{10}$$

$$\frac{1}{10}$$

$- 10$

To find the top number just multiply 2 x 1 to get your equivalent fraction.

To Subtract Fractions With Unlike Denominators

■ Now just add the numerators.

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

$$-\frac{1}{10} \quad \frac{1}{10}$$

$$\frac{1}{10}$$

Remember when subtracting fractions you never subtract the denominators.

Subtract these Fractions

$$\frac{1}{2} \qquad \frac{}{8}$$
$$-\ \frac{1}{8} \qquad \frac{}{8}$$

Use the short cut to find the Least Common Denominator (LCD).

Subtract these Fractions

$$\frac{1}{2} \times 4 = \frac{}{8}$$

$$-\ \frac{1}{8} \times 1 = \frac{}{8}$$

Now find the equivalent fractions for 1/2 & 1/8.

Ask what do you multiply 2 by to get 8 and what do you multiply 8 by to get 8.

Subtract these Fractions

$$\frac{1 \times 4 =}{2 \times 4 = 8}$$

$$\frac{1 \times 1 =}{-\ 8 \times 1 = 8}$$

Since you are writing equivalent fractions, now multiply the top numbers by the same number you did in the bottom.

Subtract these Fractions

$$\frac{1}{2} \begin{array}{l} x\ 4 = \frac{4}{8} \\ x\ 4 = 8 \end{array}$$

$$\begin{array}{l} 1\ x\ 1 = 1 \\ -\ 8\ x\ 1 = 8 \end{array}$$

Now multiply across.

Subtract these Fractions

$$\frac{1 \times 4 = 4}{2 \times 4 = 8}$$

$$\frac{1 \times 1 = 1}{-\ 8 \times 1 = 8}$$

$$\frac{3}{8}$$

Subtract your new numerators.

Subtract these Fractions

$$\frac{2}{5} \qquad \frac{}{15}$$

$$-\frac{1}{3} \qquad \frac{}{15}$$

Find the common Multiples for 5 and 3. Write This number As your new denominator.

Subtract these Fractions

$$\frac{2}{5} \times 3 = \overline{15}$$

$$-\frac{1}{3} \times 5 = \overline{15}$$

Ask yourself what you multiply the bottom number by to get 15.

Subtract these Fractions

$$\frac{2 \text{ x } 3 =}{5 \text{ x } 3 = 15}$$

$$\frac{1 \text{ x } 5 =}{-\ 3 \text{ x } 5 = 15}$$

Multiply the top number by the same number you did in the bottom.

Subtract these Fractions

$$\frac{2 \times 3 = 6}{5 \times 3 = 15}$$

$$\frac{1 \times 5 = 5}{-\ 3 \times 5 = 15}$$

Multiply across.

Subtract these Fractions

$$\frac{2 \times 3 = 6}{5 \times 3 = 15}$$

$$\frac{1 \times 5 = 5}{- \ 3 \times 5 = 15}$$

$$\frac{1}{15}$$

Now subtract your new numerators.

Subtract these Fractions

$$\frac{5}{6} \times \frac{4}{4} = \frac{20}{24}$$

$$\frac{1}{8} \times \frac{3}{3} = \frac{3}{24}$$

$$-\quad\quad\quad\quad\quad = \frac{17}{24}$$

Subtract these Fractions

$$\frac{2 \times 3 = 6}{3 \times 3 = 9}$$

$$\frac{1 \times 1 = 1}{- \ 9 \times 1 = 9}$$

$$\frac{5}{9}$$

Subtract these Fractions

$$\frac{4}{5} \times \frac{3}{3} = \frac{12}{15}$$

$$-\ \frac{2}{3} \times \frac{5}{5} = \frac{10}{15}$$

$$\frac{2}{15}$$