



Math Virtual Learning

Algebra 2/Honors Algebra 2

April 30, 2020



Lesson: April 30, 2020

Objective/Learning Target:

Students will add and subtract rational expressions with different denominators.

Let's Get Started:

What do you remember about adding and subtracting fractions with different denominators?

a) $\frac{1}{6} + \frac{2}{3}$

b) $\frac{1}{2} - \frac{1}{3}$

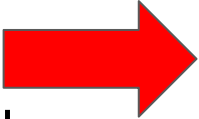
Watch Video:

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

[Mathmeeting.com](https://mathmeeting.com)

Today you will learn how to add and subtract rational expressions with different denominators. Something like this:

$$\frac{x-1}{x^2-x-6} - \frac{4}{5x+10}$$

Watch the this video  and take notes over the example.

$$\frac{x-1}{x^2-x-6} - \frac{4}{5x+10}$$

Steps for Adding and Subtracting Rational Expressions with a Common Denominator :

(write this down)

- Factor the denominators
- Identify the Least Common Denominator (LCD)
- Identify the domain (this is the restricted values for x)
- Multiply each term by what it is missing from the LCD
- Combine like terms in the numerator
- Factor and simplify if possible

Let's look at example #1:

(write this down)

Problem: $\frac{3}{x-4} + \frac{x-9}{x^2-16}$

Step 1: Factor the denominators (shown in green)

$$\frac{x+4}{x+4} \cdot \frac{3}{x-4} + \frac{x-9}{\cancel{x^2-16}} = \frac{3}{(x-4)(x+4)}$$

$$\text{LCD: } (x-4)(x+4)$$

$$\text{dom: } x \neq 4 \\ x \neq -4$$

Step 2: Identify the Least Common Denominator (shown in blue)

$$\frac{3(x+4)}{\text{LCD}} + \frac{x-9}{\text{LCD}}$$
$$\frac{3x+12}{\text{LCD}} + \frac{x-9}{\text{LCD}}$$

Step 3: Find the domain by setting the factors in the denominator equal to zero. (shown in blue)

Step 4: Multiply each term by what it is missing from the LCD (shown in blue)

$$\frac{4x+3}{\text{LCD}} = \boxed{\frac{4x+3}{(x-4)(x+4)}}$$

Step 3: Combine like terms in the numerator

Step 4: Factor and simplify if possible

Let's look at example #2:

(write this down)

Problem: (shown in red)

Step 1: Factor the denominators (shown in black)

Step 2: Identify the Least Common Denominator (shown in black)

Step 3: Find the domain by setting the factors in the denominator equal to zero. (shown in black)

Step 4: Multiply each term by what it is missing from the LCD (shown in green)

Step 3: Combine like terms in the numerator

Step 4: Factor and simplify if possible

$$\frac{x^2-11}{(x-3)(x-4)} - \frac{5}{x-4} \cdot \frac{x-3}{x-3}$$

$$\frac{x^2-11}{LCD} - \frac{5(x-3)}{LCD}$$

$$\frac{x^2-11}{LCD} - \frac{5x+15}{LCD}$$

$$\frac{x^2-5x+4}{LCD}$$

$$\frac{(x-4)(x-1)}{(x-3)(x-4)} = \frac{x-1}{x-3}$$

LCD:
 $(x-3)(x-4)$

dom: $x \neq 4$
 $x \neq 3$

Add and Subtract Rational Expressions Practice:

On the same sheet of paper,
add/subtract the following
practice problems.

1. $\frac{5}{8} - \frac{3}{8x}$

2. $\frac{2}{4x+12} + \frac{7}{x+3}$

3. $\frac{7}{x+2} - \frac{4}{x-5}$

4. $\frac{3}{y+5} + \frac{y}{y^2+7y+10}$

5. $\frac{5}{4x} + \frac{3}{2x}$

6. $\frac{2}{x-3} - \frac{1}{x+7}$

Answer Key:

Once you have completed the problems, check your answers here.

1) $\frac{5x-3}{8x}$ Domain $x \neq 0$

2) $\frac{30}{4(x+3)}$ Domain $x \neq -3$

3) $\frac{3x-43}{(x+2)(x-5)}$ Domain $x \neq -2, 5$

4) $\frac{2(2y+3)}{(y+5)(y+2)}$ Domain $y \neq -5, -2$

5) $\frac{11}{4x}$ Domain $x \neq 0$

6) $\frac{x+17}{(x-3)(x+7)}$ Domain $x \neq 3, -7$

Additional Practice:

Click on the links below to get additional practice and to check your understanding!


$$\frac{1}{t^2+t-12} - \frac{1}{t^2-7t+1}$$
$$\frac{1}{(t+4)(t-3)} - \frac{1}{(t-3)(t-4)} + \frac{1}{(t+4)(t-4)}$$
$$LCM = (t+4)(t-3)(t-4)$$
$$\frac{t-4}{(t+4)(t-3)(t-4)} - \frac{t+4}{(t+4)(t-3)(t-4)} - \frac{t-4}{(t+4)(t-3)(t-4)}$$

Adding and Subtracting
Rational Expressions with
Different Denominators
Practice - [worksheet](#) and
[answers](#)