

What's Going On?

Checking In

Homework Logs

Minds on

It's Elementary... Again, Again!

Action!

Adding and Subtracting Rational Expressions

Consolidation

Exit Card

Learning Goal - I will be able to add and subtract rational expressions.

Checking In

F.F.M.

Simplify. State any restrictions on the variables.

$$\frac{10x^2 + 3xy - y^2}{9x^2 - y^2} \times \frac{12x + 4y}{6x^2 + 3xy}$$

****This is from that 2-Column Quiz handout!**

$$= \frac{10x^2 + 5xy - 2xy - y^2}{(3x+y)(3x-y)} \times \frac{4(3x+y)}{3x(2x+y)}$$

$$= \frac{5x(2x+y) - y(2x+y)}{(3x+y)(3x-y)} \times \frac{4(3x+y)}{3x(2x+y)}$$

$$= \frac{4(2x+y)(5x-y)(3x+y)}{3x(3x+y)(3x-y)(2x+y)}$$

$$x \neq 0, -\frac{1}{3}y, \frac{1}{3}y, -\frac{1}{2}y$$

or
or
or

$$\frac{-y}{3} \quad \frac{y}{3} \quad \frac{y}{2}$$

$$= \frac{4(2x+y)(5x-y)(3x+y)}{3x(3x+y)(3x-y)(2x+y)}$$

$$= \frac{4(5x-y)}{3x(3x-y)}, \quad x \neq 0, \frac{1}{2}y, \pm \frac{1}{3}y$$

Unit Test Wednesday

"The Day After Tomorrow"



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It's Elementary... Again

Evaluate. No calculators!

$$\frac{4 \cdot 2}{4 \cdot 3} + \frac{3 \cdot 3}{4 \cdot 3}$$

Find LCM of denominators

$$\frac{8}{12} + \frac{9}{12}$$

$$= \frac{8 + 9}{12}$$

$$= \frac{17}{12}$$

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It's Elementary... Again

Evaluate. Show your steps.**NO CALCULATORS**

$$\frac{1}{2} + \frac{3}{4}$$
$$= \frac{2}{4} + \frac{3}{4}$$
$$= \frac{5}{4}$$

$$\frac{\overset{\times 4}{3}}{\overset{\times 5}{5}} + \frac{\overset{7 \times 5}{4 \times 5}}{\overset{4 \times 5}{4 \times 5}}$$
$$= \frac{12 + 35}{20}$$
$$= \frac{47}{20}$$

$$\frac{\overset{5 \times 2}{5 \times 3}}{\overset{4 \times 3}{5 \times 3}} + \frac{\overset{4 \times 3}{5 \times 3}}{\overset{5 \times 3}{5 \times 3}}$$
$$= \frac{10 + 12}{15}$$
$$= \frac{22}{15}$$

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It's Elementary... Again

Evaluate. Show your steps.**NO CALCULATORS**

$$\frac{2 \times 7}{2 \times 8} - \frac{1 \times 8}{2 \times 8}$$

$$= \frac{14 - 8}{16}$$

$$= \frac{6}{16}$$
$$= \frac{3}{8}$$

$$\frac{3 \times 5}{3 \times 6} - \frac{2 \times 6}{3 \times 6}$$

$$= \frac{15 - 12}{18}$$

$$= \frac{3}{18}$$

$$= \frac{1}{6}$$

$$\frac{5 \times 4}{5 \times 3} - \frac{3 \times 3}{5 \times 3}$$

$$= \frac{20 - 9}{15}$$

$$= \frac{11}{15}$$

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It's Elementary... Again

Evaluate. Show your steps.

NO CALCULATORS

$$\frac{10.1}{2} + \frac{5.3}{4} - \frac{4.1}{5}$$

Lowest common multiple of 2, 4 and 5 is 20.

Get each denominator to 20 by multiplying.

$$= \frac{10 + 15 - 4}{20}$$

$$= \frac{21}{20}$$

$$\frac{15.3}{4} + \frac{20.5}{3} - \frac{12.1}{5}$$

Lowest common multiple of 4, 3 and 5 is 60.

Get each denominator to 60 by multiplying.

$$= \frac{45 + 100 - 12}{60}$$

$$= \frac{133}{60}$$

$$\frac{6.3}{7} + \frac{21.1}{2} - \frac{14.1}{3}$$

Lowest common multiple of 7, 2 and 3 is 42.

Get each denominator to 42 by multiplying.

$$= \frac{14 + 21 - 14}{42}$$

$$= \frac{21}{42}$$

Minds on

It's Secondary...

Evaluate. Show your steps.

NO CALCULATORS

$\frac{3 \cdot 3}{3 \cdot 2x^2} + \frac{1 \cdot 2x}{3x \cdot 2x}$ <p>LCM is $6x^2$</p> $= \frac{9}{6x^2} + \frac{2x}{6x^2}$ $= \frac{2x + 9}{6x^2} \quad ; x \neq 0$	$\frac{x^2 \cdot 7}{x^2 \cdot 4x} + \frac{5 \cdot 2}{2x^3 \cdot 2}$ <p>LCM is $4x^3$</p> $= \frac{7x^2 + 10}{4x^3}$ <p>$x \neq 0$</p>	$\frac{x^4 \cdot 1}{x^4 \cdot 8} + \frac{3 \cdot 2}{4x^4 \cdot 2}$ <p>LCM is </p> $= \frac{x^4 + 6}{8x^4}$ <p>$x \neq 0$</p>
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Action!

Adding and Subtracting Rational Expressions

To add and subtract rational expressions:

1. Factor.
2. State restrictions. (zeros of the denominators)
3. Find the lowest common denominator (LCD).
The LCD is the product of any common factors and all the unique factors.
The LCD is not always the product of all the denominators.
4. Rewrite each term using the LCD as the denominator.
5. Add or subtract the numerators.
6. Simplify.

Action!

Adding and Subtracting Rational Expressions

Example 1: Simplify and state any restrictions on the variables: $\frac{3}{8x^2} + \frac{1}{4x} - \frac{5}{6x^3}$

$$\frac{3}{8x^2} + \frac{1}{4x} - \frac{5}{6x^3} ; x \neq 0$$

$$\text{LCM} \rightarrow 24x^3$$

$$\frac{3x \cdot 3}{3x \cdot 8x^2} + \frac{6x^2 \cdot 1}{6x^2 \cdot 4x} - \frac{4 \cdot 5}{4 \cdot 6x^3}$$

$$= \frac{9x + 6x^2 - 20}{24x^3}$$

$$= \frac{6x^2 + 9x - 20}{24x^3} ; x \neq 0$$

Action!

Adding and Subtracting Rational Expressions

Example 2: Simplify and state any restrictions on the variables: $\frac{3n}{2n+1} + \frac{4}{n-3}$

$$\frac{(n-3)}{(n-3)} \frac{3n}{2n+1} + \frac{4}{n-3} \frac{(2n+1)}{(2n+1)}$$

$$\begin{array}{l} \downarrow \\ 2n+1 \neq 0 \\ n \neq -\frac{1}{2} \end{array}$$

$$\downarrow \\ n \neq 3$$

$$\frac{3n(n-3) + 4(2n+1)}{(2n+1)(n-3)}$$

$$= \frac{3n^2 - 9n + 8n + 4}{(2n+1)(n-3)}$$

$$= \frac{3n^2 - n + 4}{(2n+1)(n-3)} ; n \neq -\frac{1}{2}, 3$$

Action!

Adding and Subtracting Rational Expressions

Example 3: Simplify and state any restrictions on the variables: $\frac{2t}{t^2-1} - \frac{t+2}{t^2+3t-4}$

$$\begin{aligned}
 & \frac{2t}{t^2-1} - \frac{t+2}{t^2+3t-4} \\
 \textcircled{\times} &= \frac{(t+4) \cancel{2t}}{(t+4)(t+1)(t-1)} - \frac{(t+1) \cancel{(t+2)}}{(t+1)(t+4)(t-1)} \quad ; t \neq \pm 1, -4 \\
 &= \frac{2t(t+4) - (t+1)(t+2)}{(t+4)(t+1)(t-1)} \\
 &= \frac{2t^2 + 8t - (t^2 + 3t + 2)}{(t+1)(t-1)(t+4)} \\
 &= \frac{t^2 + 5t - 2}{(t+1)(t-1)(t+4)} \quad ; t \neq \pm 1, -4
 \end{aligned}$$

Consolidation

Exit Card

Simplify and state restrictions.

$$\frac{4x}{x^2 + 6x + 8} - \frac{3x}{x^2 - 4}$$

Consolidation

Homework!

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