

Math 3 Unit 4 Obj 3 Adding /Subtracting Rational Expressions with Like Denominators NOTES

The same rules used to add and subtract numerical fractions can be applied to rational expressions. You can add the numerators of rational expressions with like denominators. If a , b , and c represent polynomials (with $c \neq 0$), then $\frac{a}{c} + \frac{b}{c} = \frac{a+b}{c}$.

Addition & Subtraction-If the denominators are already common:

[1-5] Simplify the following:

1. $\frac{4}{3y} + \frac{5}{3y}$

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

3. $\frac{-7x}{2x+7} + \frac{x-21}{2x+7}$

5. $\frac{3y+2}{y+4} - \frac{y-6}{y+4}$

Steps

1. Add or subtract the numerators (the denominator stays the same).
2. Completely factor the numerator and denominator (if possible)
 - *gcf factoring
 - *trinomial factoring
 - *difference of squares
3. Reduce common factors (if possible)

4. $\frac{x}{x^2+4x+4} + \frac{2}{x^2+4x+4}$

6. $\frac{2y^2+5y+3}{3y+1} - \frac{-y^2-2y+1}{1+3y}$

Adding and Subtracting Rational Expressions with Unlike Denominators

Ex) What is the difference $\frac{3}{x-1} - \frac{2}{x+2}$?

Steps

1. Find a common denominator (lowest is best)
2. Rewrite each rational expression using the common denominator.

*Multiply by "one": $\frac{\text{missing factor}}{\text{missing factor}}$
3. Simplify as needed.
4. Add/Subtract the numerators (the denominator stays the same).
5. Completely factor the numerator and denominator (if possible)
 - *gcf factoring
 - *trinomial factoring
 - *difference of squares
6. Reduce common factors (if possible)

1. $\frac{5}{x(x-5)} - \frac{x}{5(x-5)}$

2. $\frac{7x}{x-9} + \frac{3x}{9-x}$

3. $\frac{6}{5x^8} + \frac{4}{3x^6}$

4. $\frac{4}{x^2-4} - \frac{5}{2-x}$

5. $\frac{y-2}{y+1} - \frac{3-12y}{2y^2-y-3}$