U1D6_T Adding and Subtracting Rational Expressions I

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U1D6_T
Adding an...

U1D6 MCR 3UI

Adding & Subtracting Rational Expressions Part I

When adding and subtracting rational expressions, we use the same rule for adding and subtracting fractions!

1. Factor the numerator & the denominators(s) (if possible).
2. Determine the common denominator and rewrite the expression with the common denominator.
3. Simplify the numerator(s). (You may need to expand, add/subtract like terms, and then refactor).
4. Divide any common factors if possible.
5. Simplify, if possible.
6. state restrictions on the variable(s).

Examples: Simplify and state restrictions for each of the following.

(a) $\frac{16t-11}{7}+\frac{4-2t}{7}$

$=\frac{16t-11+4-2t}{7}$

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

$=\frac{7(2t-1)}{7_1}$

$=2t-1$

* no variable ever in denominator so, no restrictions.

(b) $\frac{3m}{8}-\frac{5m}{6}-\frac{2m}{3}$ LCD 24

$\frac{3m}{8_{x3}}-\frac{5m^{x4}}{6_{x4}}-\frac{2m^{x8}}{3_{x8}}$

$=\frac{3m(3)-5m(4)-2m(8)}{24}$

$=\frac{9m-20m-16m}{24}$

$=\frac{-27m}{24}$

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

(c) $\frac{3a-b}{9} - \frac{a-2b}{3} - \frac{4a-3b}{6}$ LCD 18

$= \frac{2(3a-b) - 6(a-2b) - 3(4a-3b)}{18}$

$= \frac{6a - 2b - 6a + 12b - 12a + 9b}{18}$

$= \frac{-12a + 19b}{18}$ No restrictions.

(d) $\frac{2x^2+3x+1}{4x^2-9} - \frac{x^2-3x-1}{9-4x^2}$ $-4x^2+9$

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

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

$= \frac{3x^2}{4x^2-9}$ must factor to find the restriction

$4x^2-9 \neq 0$

$(2x-3)(2x+3) \neq 0$

$2x-3 \neq 0$ or $2x+3 \neq 0$

$2x \neq 3$ $2x \neq -3$

$x \neq \frac{3}{2}$ $x \neq \frac{-3}{2}$

OR $\frac{3x^2}{(2x-3)(2x+3)}$

$x \neq \pm\frac{3}{2}$

$4x^2-9 \neq 0$

$4x^2 \neq 9$

$x^2 \neq \frac{9}{4}$

$x \neq \pm\sqrt{\frac{9}{4}}$

$x \neq \pm\frac{3}{2}$

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