





Rational Expression
 Numerator → Polynomial
 Denominator → Polynomial
 7x+14

4.3 Add & Subtract Monomial Denominators

Recall: In order to add and subtract fractions, we need a COMMON DENOMINATOR. The same idea applies for rational expressions.

Add or subtract.

$\frac{4}{4} \cdot \frac{2}{3} + \frac{3}{4} \cdot \frac{3}{3}$	$\frac{4}{4} \cdot \frac{3}{5} - \frac{9}{20}$	$\frac{3}{3} \cdot \frac{1}{6} - \frac{7}{9} \cdot \frac{2}{2}$
LCM: 12	LCM: 20	LCM: 18
$\frac{8}{12} + \frac{9}{12} = \boxed{\frac{17}{12}}$	$\frac{12}{20} - \frac{9}{20} = \boxed{\frac{3}{20}}$	$\frac{3}{18} - \frac{14}{18} = \boxed{\frac{-11}{18}}$

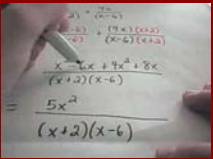




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In terms of rational expressions, we find a common denominator by finding the least common multiple of the denominators:

<p>Ex.) $\frac{5}{2} \cdot \frac{5}{3x^2} + \frac{x}{2} \cdot \frac{3x^2}{3x^2}$</p> <p>LCM: $6x^2$</p> <p>$= \frac{10}{6x^2} + \frac{3x^3}{6x^2}$</p> <p>$= \boxed{\frac{10+3x^3}{6x^2}} \quad x \neq 0$</p>	<p>$\frac{5x}{5x} \cdot \frac{1}{6xy} - \frac{2}{15x^2} \cdot \frac{2y}{2y}$</p> <p>LCM: $30x^2y$</p> <p>$= \frac{5x}{30x^2y} - \frac{4y}{30x^2y}$</p> <p>$= \boxed{\frac{5x-4y}{30x^2y}} \quad x, y \neq 0$</p>
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Ex.) $\frac{3}{3a} \cdot \frac{(x-2)}{4x^2} + \frac{(x+6)}{6x} \cdot \frac{2x}{2x}$

LCM: $12x^2$

$= \frac{3x-6}{12x^2} + \frac{2x^2+12x}{12x^2}$

$= \frac{2x^2+15x-6}{12x^2} \quad x \neq 0$

Ask yourself:

- is there a GCF
- can this factor.

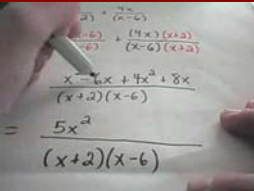
* b) $\frac{2a+1}{2a^2b} + \frac{-1(b-3)}{9ab^2}$

$= \frac{9b \cdot (2a+1)}{9b \cdot 2a^2b} + \frac{(-b+3) \cdot 2a}{9ab^2 \cdot 2a}$

LCM: $18a^2b^2$

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

$= \frac{16ab+6a+9b}{18a^2b^2} \quad a, b \neq 0$



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10. Here is a student's solution for subtracting rational expressions. Identify the error in the solution. Write a correct solution.

$$\begin{aligned}
 \frac{(3x+6)}{2x^2} - \frac{(x-4)}{3x} &= \frac{(3x+6) \cdot 3}{2x^2 \cdot 3} - \frac{(x-4) \cdot 2x}{3x \cdot 2x} \\
 \text{LCM: } 6x^2 &= \frac{3(3x+6)}{6x^2} - \frac{2x(x-4)}{6x^2} \\
 &= \frac{9x+18-2x^2+8x}{6x^2} = \frac{-2x^2+17x+18}{6x^2} \\
 &= \frac{-2x^2+x+18}{6x^2}, x \neq 0
 \end{aligned}$$

