8.4 Adding & Subtracting Rational Expressions

Obj: 1. Add/Subtract Rational exp.

$$\frac{1}{7}+\frac{3}{7}=\frac{4}{7}$$

$$\frac{3}{x^2}+\frac{5}{x^2}=\frac{8}{x^2}$$

$$\frac{2x}{x+3}+\frac{5}{x+3}=\frac{2x+5}{x+3}$$

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

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$$\frac{3x-1}{2x-1}+\frac{5+2x}{2x-1}$$

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

$$\frac{2x}{x-5}-\frac{10}{x-5}=\frac{2x-10}{x-5}=\frac{2(x-5)}{x-5}=2$$

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$\frac{3}{3}\left(\frac{7}{300}\right) + \left(\frac{1}{90}\right)\frac{10}{10}$

$3\cdot10\cdot10$ $3\cdot3\cdot10$

LCD: $3\cdot10\cdot10\cdot3$

$\frac{21}{900} + \frac{10}{900} = \frac{31}{900}$

$\frac{3}{3}\left(\frac{7}{3x^2}\right) + \left(\frac{1}{9x}\right)\frac{x}{x}$

$3\cdot x\cdot x$ $3\cdot3\cdot x$

LCD: $3x\cdot x\cdot3$

$\frac{21}{9x^2} + \frac{x}{9x^2} = \frac{21+x}{9x^2}$

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$\frac{(x+2)\,x}{(x+2)(x-2)} + \frac{-8}{x^2-4}$

$(x+2)(x-2)$

LCD: $(x-2)(x+2)$

$\frac{x^2+2x}{(x+2)(x-2)} + \frac{-8}{(x+2)(x-2)}$

$\rightarrow \frac{x^2+2x-8}{(x+2)(x-2)} = \frac{(x+4)(x-2)}{(x+2)(x-2)}$

$= \frac{x+4}{x+2}$

Domain Restriction: $x+2\neq0$ $\rightarrow x\neq-2$

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$$\frac{(x-5)\,x}{(x-5)(x+5)} + \frac{-50}{x^2-25}$$

$(x+5)(x-5)$ LCD: $(x+5)(x-5)$

$$\frac{x^2-5x-50}{(x+5)(x-5)} = \frac{(x-10)(x+5)}{(x+5)(x-5)} = \frac{x-10}{x-5}, \quad x \neq 5$$

$$\frac{(x-6)\,x}{(x-6)(x+6)} - \frac{72}{x^2-36}$$

$(x+6)(x-6)$ LCD:

$$\frac{x^2-6x-72}{(x+6)(x-6)} = \frac{(x-12)(x+6)}{(x+6)(x-6)} = \frac{x-12}{x-6}, \quad x \neq 6$$

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$$\frac{(2x+5)\,6x}{(2x+5)(3x-1)} - \frac{4x}{2x+5}\cdot\frac{(3x-1)}{(3x-1)}$$ LCD: $(3x-1)(2x+5)$

$$\frac{12x^2+30x}{(2x+5)(3x-1)} - \frac{12x^2-4x}{(2x+5)(3x-1)}$$

$$\frac{12x^2+30x-12x^2+4x}{(2x+5)(3x-1)} = \frac{34x}{6x^2+13x-5}$$

$2x+5 \neq 0$ $\quad 3x-1 \neq 0$

$x \neq -\frac{5}{2}$ $\quad x \neq \frac{1}{3}$

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