Add/Subtract

1) $\dfrac{4x}{x+3}+\dfrac{x+6}{x+3}$

$$\dfrac{5x+6}{x+3}$$

2) $\dfrac{x^2}{x+4}-\dfrac{16}{x+4} = \dfrac{x^2-16}{x+4}$

$$\dfrac{(x+4)(x-4)}{x+4}$$

$$\boxed{x-4}$$

Multiply/Divide

3) $\dfrac{10-2x}{7}\cdot\dfrac{14}{5x-25}$

$-1 \cdot 2(5-x) \quad 14 \,^2$

$7 \,^1 \quad 5(x-5)$

$$\dfrac{-4}{5}$$

4) $\dfrac{7}{3x}\div\dfrac{14-7x}{18-9x}$

$$\dfrac{7}{3x}\cdot\dfrac{18-9x}{14-7x}$$

$\dfrac{9(2-x)}{} \quad ^3$

$7(2-x)$

$$\dfrac{3}{x}$$

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Adding and subtracting Rational
Expressions

Be able to add or subtract rational
expressions with unlike denominators.

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Adding or Subtracting Rational Expressions with Unlike Denominators

Step 1: Find the Least Common Denominator (LCD) of the rational expressions

Step 2: Write each rational expression as an equivalent rational expression with the LCD *(multiply the numerator and denominator of each fraction by any missing factors to form the LCD)*

Step 3: Add or subtract numerators, and write over the common denominator *(remember to distribute the negative to all terms in the numerator that follow the subtraction sign)*

Step 4: Simplify the resulting rational expression.

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Add or Subtract the following

a. $\dfrac{2a}{2a} \dfrac{7}{a^3b} + \dfrac{9}{2a^4b}$ LCD $2a\cdot a\cdot a\cdot b\ \ a$ $2a^4b$

$2\cdot a\cdot a\cdot a\cdot b$

$\dfrac{14a+9}{2a^4b}$

$2\cdot a\cdot a\cdot a\cdot b$

b. $\dfrac{x-5}{x-5} \dfrac{1}{x+5} + \dfrac{6x}{x-5} \dfrac{x+5}{x+5}$

$\dfrac{1(x-5)+6x(x+5)}{(x+5)(x-5)}$

$\dfrac{x-5+6x^2+30x}{(x+5)(x-5)}$

$\dfrac{6x^2+31x-5}{(x+5)(x-5)}$

$\dfrac{2m-20}{m-6} - \dfrac{8}{6-m}$

$\dfrac{-8}{(-6+m)}$

$\dfrac{2m-20}{m-6} + \dfrac{8}{m-6}$

$\dfrac{2m-12}{m-6} = \dfrac{2(m-6)}{m-6} = 2$

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Add or Subtract the following

$$\frac{\overset{y-3}{\cancel{4}}}{\underset{y+3}{\cancel{y-3}}} + \frac{-5y}{y-3}\cdot\frac{y+3}{y+3}$$

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

$$\frac{4y-12 - 5y^2 - 15y}{(y+3)(y-3)}$$

$$\frac{-5y^2 - 11y - 12}{(y+3)(y-3)}$$

$$\frac{3z-18}{z-5} - \frac{3}{5-z}$$

$$\frac{3z-18}{z-5} + \frac{+3}{z-5}$$

$$\frac{3z-15}{z-5}$$

$$\frac{3\cancel{(z-5)}}{\cancel{(z-5)}} = \boxed{3}$$

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Subtract $\frac{\cancel{x-1}}{\cancel{x-1}}\cdot\frac{2x}{x^2-9} + \frac{-3}{x^2-4x+3}\cdot\frac{x+3}{x+3}$

LCD: $(x+3)(x-3)(x-1)$

$(x+3)(x-3)$ $(x-3)(x-1)$

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

$$\frac{2x^2 - 5x - 9}{(x+3)(x-3)(x-1)}$$

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