12-5 Adding and Subtracting Rational Expressions

Adding and Subtracting with **Common Denominators**

Rule: add/subtract numerators   KEEP denominator the same

$$\frac{3}{10}+\frac{6}{10}=\boxed{\frac{9}{10}}$$

$$\frac{8x}{13}-\frac{4x}{13}=\boxed{\frac{4x}{13}}$$

$$\frac{x}{x+2}+\frac{5}{x+2}=\boxed{\frac{(x+5)}{(x+2)}}$$

Adding Then Simplifying

1. $\dfrac{5x-10}{6}+\dfrac{x-2}{6}=\dfrac{6x-12}{6}$

$$1x-2$$

$$\boxed{x-2}$$

2. $\dfrac{x^2}{x+3}+\dfrac{11x+24}{x+3}=\dfrac{x^2+11x+24}{x+3}$

$$\frac{\overset{1}{\cancel{(x+3)}}(x+8)}{\cancel{x+3}}$$

$$\frac{1}{}$$

$$\boxed{x+8}$$

Subtracting Then Simplifying

3. $\dfrac{6x+1}{3x}-\dfrac{3x+4}{3x}=\dfrac{3x-3}{3x}$

$$\frac{\cancel{3}(x-1)}{\cancel{3}x}$$

$$\boxed{\dfrac{x-1}{x}}$$

4. $\dfrac{9x}{2x+7}-\dfrac{x-28}{2x+7}=\dfrac{8x+28}{2x+7}$

$$\frac{4\cancel{(2x+7)}}{\cancel{(2x+7)}}$$

$$\boxed{4}$$

Adding and Subtracting with **UN-Common Denominators**

Rule: GET COMMON DENOMINATORS

$\dfrac{1}{6}+\dfrac{3}{4}=$ LCD:

$\dfrac{5}{10}-\dfrac{x}{5x}=$ LCD:

$\dfrac{1}{6}\cdot\dfrac{\cdot 2}{\cdot 2}\quad\dfrac{2}{12}$

$\dfrac{3}{4}\cdot\dfrac{\cdot 3}{\cdot 3}\quad\dfrac{9}{12}$

$\dfrac{2}{12}+\dfrac{9}{12}=\boxed{\dfrac{11}{12}}$

$\dfrac{5}{10}\cdot\dfrac{\cdot x}{\cdot x}\quad\dfrac{5x}{10x}$

$\dfrac{x}{5x}\cdot\dfrac{\cdot 2}{\cdot 2}\quad\dfrac{2x}{10x}$

$\dfrac{5x}{10x}-\dfrac{2x}{10x}=\dfrac{3x}{10x}$

$=\boxed{\dfrac{3}{10}}$

Adding Then Simplifying

$\dfrac{6}{5x^8}+\dfrac{4}{3x^8}=$ LCD:

$\dfrac{5-2x}{3x}+\dfrac{12-4x}{6x}=$ LCD:

$\dfrac{6}{5x^8}\cdot\dfrac{\cdot 3}{\cdot 3}\quad\dfrac{18}{15x^8}$

$\dfrac{4}{3x^8}\cdot\dfrac{\cdot 5}{\cdot 5}\quad\dfrac{20}{15x^8}$

$\dfrac{18}{15x^8}+\dfrac{20}{15x^8}$

$=\boxed{\dfrac{38}{15x^8}}$

$\dfrac{(5-2x)\cdot 2}{3x\cdot 2}\quad\dfrac{10-4x}{6x}$

$\dfrac{12-4x}{6x}\quad\dfrac{12-4x}{6x}$

$\dfrac{10-4x}{6x}+\dfrac{12-4x}{6x}$

$=\dfrac{22-8x}{6x}$

Subtracting Then Simplifying

$\dfrac{3}{8x}-\dfrac{1}{12}=$ LCD:

$\dfrac{x}{x-4}-\dfrac{24}{(x+2)(x-4)}=$ LCD:

$\dfrac{2(11-4x)}{6x}$

$\boxed{\dfrac{11-4x}{3x}}$

What is $\dfrac{2+x}{5x} - \dfrac{x-2}{5x}$ expressed in simplest form?

2. What is the sum of $\dfrac{3x^2}{x-2}$ and $\dfrac{x^2}{x-2}$?

3. What is the sum of $\dfrac{-x+7}{2x+4}$ and $\dfrac{2x+5}{2x+4}$?

4. What is $\dfrac{x^3}{x+3} - \dfrac{9x}{x+3}$ expressed in simplest form?

5. What is the result, in simplest form, when $\dfrac{4x-5}{x^2-64}$ is subtracted from $\dfrac{5x+3}{x^2-64}$?

6. What is the sum of $\dfrac{3}{2x}$ and $\dfrac{7}{4x}$?

7. What is the difference of $\dfrac{6}{5x}$ and $\dfrac{2}{3x}$?

8. Subtract and simplify $\dfrac{x-7}{6} - \dfrac{3x-2}{12}$

9. Express in simplest form: $\dfrac{5x+3}{x} - \dfrac{x-1}{2x}$

10. What is the sum of $\dfrac{-4+x}{5x}$ and $\dfrac{-3x-2}{4x}$?