**12.6: Add and Subtract Rational Expressions:**

**Goals:** \*Add/Subtract rational expressions with a common denominator

 \*Find the least common denominator of rational expressions

 \*Add/subtract rational expressions with unlike denominators

**Add/subtract rational expressions with the same denominator:**

**Ex:  Ex:  Ex: **

$\frac{12}{3x}=\frac{4}{x}$ $\frac{2x-5}{x-1}$ $\frac{y+3}{y}$

**Ex:  Ex:  Ex: **

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

**Find least common denominator:**

**\*\*HINT:** If you had  what would be the quickest way to find a common denominator? Multiply the denominators together.

**Ex: ** and  **Ex: ** and **Ex: **and 

LCD: 20*r*² LCD: (*x* – 3)²(*x* + 2) (*c* – 2)(2*c* + 7)

**Add expressions with different denominators:**

**Ex:  Ex: **

 $\frac{9}{8x^{2}}∙\frac{3x}{3x}+\frac{5}{12x^{3}}∙\frac{2}{2}$ $\frac{10}{3x}∙\frac{\left(x+2\right)}{\left(x+2\right)}-\frac{7x}{x+2}∙\frac{3x}{3x}$

 $\frac{27x}{24x^{3}}+\frac{10}{24x^{3}}$ $\frac{10(x+2)}{3x(x+2)}-\frac{21x^{2}}{3x(x+2)}$

 $\frac{27x+10}{24x^{3}}$ $\frac{-21x^{2}+10x+20}{3x(x+2)}$

**Ex:  Ex: **

 $\frac{6x}{18x^{2}}+\frac{12}{18x^{2}}$ $\frac{5(x-1)}{2x(x-1)}-\frac{6x^{2}}{2x(x-1)}$

 $\frac{6x+12}{18x^{2}}$ $\frac{-6x^{2}+5x-5}{2x(x-1)}$

 $\frac{6(x+2)}{18x^{2}}$

 $ \frac{x+2}{3x^{2}}$

**Ex:  Ex: **

 $\frac{15x^{3}+14}{10x^{4}}$ $\frac{y^{2}+5y+3}{(y+1)(y+2)}$

**Ex:  Ex: **

 $\frac{x+4}{(x-2)(x+5)}-\frac{x-1}{(x+4)(x-2)}$ $\frac{2z-1}{(z+4)(z-2)}-\frac{z+1}{(z+2)(z-2)}$

 $\frac{x+4}{(x-2)(x+5)}∙\frac{\left(x+4\right)}{\left(x+4\right)}-\frac{x-1}{(x+4)(x-2)}∙\frac{x+5}{x+5}$ $\frac{2z-1}{(z+4)(z-2)}∙\frac{\left(z+2\right)}{\left(z+2\right)}-\frac{z+1}{(z+2)(z-2)}∙\frac{(z+4)}{(z+4)}$

 $\frac{(x+4)(x+4)}{(x-2)(x+5)(x+4)}-\frac{(x-1)(x+5)}{(x-2)(x+5)(x+4)}$ $\frac{(2z-1)(z+2)}{(z+4)(z-2)(z+2)}-\frac{(z+1)(z+4)}{(z+4)(z-2)(z+2)}$

 $\frac{x^{2}+8x+16-x^{2}-4x+5}{(x-2)(x+5)(x+4)}$ $\frac{2z^{2}+3z-2-z^{2}-5z-4}{(z+4)(z+2)(z-2)}$

 $\frac{4x+21}{(x-2)(x+4)(x+5)}$ $\frac{z^{2}-2z-6}{(z+4)(z-2)(z+2)}$

**Ex: **

 $\frac{4x+30}{(x-3(x-5)(x+4)}$