Chapter 9 so far:

- Determine if a relationship is Direct Variation, Inverse → *constant ratio* — **ConSTANT PRoduct**
  Variation, or neither and write a variation equation.
- Write a variation equation for combined variations and find the constant.
- Write equations and graph transformed reciprocal functions.
- Find holes, VA, HA, x-int, y-int, and graph rational functions.
- Simplify a rational expression and the product or quotient of rational expressions.

Chapter 9: Still to do

- Find the sum or difference of two rational expressions.
- Solve rational equations.

Sec 9-5: Sum & Difference of Rational Expressions

Simplify.

1. $\dfrac{4}{x-3} + \dfrac{7x}{x^2+2x-15}$

$\dfrac{(x+5)\,4}{(x+5)(x-3)} + \dfrac{7x}{(x-3)(x+5)}$

$\dfrac{11x+20}{(x-3)(x+5)}$

2. $\dfrac{2x}{x^2-x-20} + \dfrac{3}{x^2+x-30}$

$\dfrac{(x+6)}{(x+6)}\cdot\dfrac{2x}{(x-5)(x+4)} \; (+) \; \dfrac{3}{(x-5)(x+6)}\cdot\dfrac{(x+4)}{(x+4)}$

$\dfrac{2x^2+12x+3x+12}{(x-5)(x+4)(x+6)} = \dfrac{2x^2+15x+12}{(x-5)(x+4)(x+6)}$

3. $\dfrac{4x}{x^2 + 9x + 14} - \dfrac{9}{x^2 - 2x - 8}$

$$\dfrac{\cancel{(x-4)}}{\cancel{(x-4)}} \dfrac{4x}{(x+7)(x+2)} - \dfrac{9}{(x-4)(x+2)} \cdot \dfrac{x+7}{x+7}$$

$$\dfrac{4x^2 - 16x - 9x - 63}{(x+2)(x+7)(x-4)} = \boxed{\dfrac{4x^2 - 25x - 63}{(x+2)(x+7)(x-4)}}$$

4. $\dfrac{2x}{x^2 + 6x + 9} - \dfrac{5}{x^2 - x - 12}$

$$\dfrac{\cancel{(x-4)}}{\cancel{(x-4)}} \dfrac{2x}{(x+3)(x+3)} - \dfrac{5}{(x+3)(x-4)} \cdot \dfrac{(x+3)}{(x+3)}$$

$$\dfrac{2x - 8x - 5x - 15}{(x+3)(x+3)(x-4)} = \boxed{\dfrac{2x^2 - 13x - 15}{(x+3)(x+3)(x-4)}}$$

Sec 9-5: Simplifying complex rational expressions.

5. Simplify.

$$\dfrac{\left(\dfrac{5}{x+3} + 7\right)}{\left(4 - \dfrac{2}{x+3}\right)} \cdot \dfrac{x+3}{x+3} = \dfrac{5 + 7x + 21}{4x + 12 \quad -2}$$

$$= \boxed{\dfrac{7x + 26}{4x + 10}}$$

6.

$$\dfrac{\dfrac{2x}{y^4} + \dfrac{5}{x^2 y}}{\dfrac{8}{xy} - \dfrac{y}{x^3}} \cdot \dfrac{x^3 y^4}{x^3 y^4} = \boxed{\dfrac{2x^4 + 5xy^3}{8x^2y^3 - y^5}}$$

You can now finish Hwk #29.