

## Section A.2

### Section Objectives:

- Know what polynomials and rational functions are.
- Add, subtract and multiply polynomials.
- Factor polynomials (quadratic, difference of squares)
- Add, subtract, multiply and divide rational expressions.
- Solve equations involving polynomials and rational expressions.
- Simplify rational expressions using rationalization.

### Practice Problems

1. Let

$$f(x) = 2x^2 + 3x \quad g(x) = 2x^2 - 7x + 6 \quad h(x) = 4x + 1$$

(a) Find and simplify  $f(x) - g(x)$ .

$$\begin{aligned} 2x^2 + 3x - (2x^2 - 7x + 6) &= 2x^2 + 3x - 2x^2 + 7x - 6 \\ &= 10x - 6 \end{aligned}$$

(b) Find and simplify  $f(x) \cdot h(x)$ .

$$\begin{aligned} (2x^2 + 3x)(4x + 1) &= 8x^3 + 12x^2 + 2x^2 + 3x \\ &= 8x^3 + 14x^2 + 3x \end{aligned}$$

(c) Find and simplify  $g(x) \cdot h(x)$ .

$$\begin{aligned} (2x^2 - 7x + 6)(4x + 1) &= 8x^3 - 28x^2 + 24x + 2x^2 - 7x + 6 \\ &= 8x^3 - 26x^2 + 17x + 6 \end{aligned}$$

(d) Factor  $f(x)$  completely.

$$f(x) = 2x^2 + 3x = x(2x + 3)$$

(e) Factor  $g(x)$  completely.

$$g(x) = 2x^2 - 7x + 6 = (x - 2)(2x - 3)$$

(f) Find and simplify  $\frac{f(x)}{h(x)} + \frac{h(x)}{f(x)}$ .

$$\frac{f(x)}{h(x)} + \frac{h(x)}{f(x)} = \frac{(2x^2 + 3x)}{(4x + 1)}$$

(g) Find and simplify  $\frac{\frac{f(x)}{g(x)}}{h(x)}$ .

(h) Find and simplify  $\frac{f(x)}{\frac{g(x)}{h(x)}}$ .

2. Simplify  $x^2 - 4y^2$ .

3. Solve for  $s$ :  $s^4 - 9 = 0$ .

4. Simplify the following expression by rationalizing the numerator. Let  $f(x) = \sqrt{x}$

$$\frac{f(x) - f(4)}{x - 4}.$$

**More Practice from Textbook A.2:** You should do as many problems from each set (1-14, 15-26, 27-38, 39-46, 47-58, 59-66 and 67-70), as needed until you are comfortable with these techniques.