

REVIEW ~ UNIT 1

RATIONAL EXPRESSIONS

1. REDUCING RATIONAL (practice questions text pg 132 #10 d,e,f)

- monomials: GO CRAZY and reduce numbers and/or variables that are divisible (there is no factoring when we have a rational expression with monomials in the numerator and denominator)
- all other rational expressions: FACTOR FIRST!!!! then reduce the expression using the factored form
- don't forget to state restrictions whenever you are reducing a rational expression

a) $\frac{35x^8y^2z^{10}}{50x^{10}yz^5}$
(monomial!)

$$= \frac{7yz^5}{10x^2}$$

b) $\frac{3a^2}{6a^2 - 12a}$

$$= \frac{3a^2}{6a(a-2)}$$

$$= \frac{a}{2(a-2)}$$

c) $\frac{2a^2 - 7a - 15}{a-5}$

$$= \frac{(2a+3)(a-5)}{(a-5)}$$

$$= 2a+3$$

d) $\frac{6a^2 - 7a - 3}{12a^2 + 7a + 1}$

$$= \frac{(3a+1)(2a-3)}{(4a+1)(3a+1)}$$

$$= \frac{(2a-3)}{(4a+1)}$$

e) $\frac{3k^2 - 9k^3}{6k^2 - 2k}$

$$= \frac{3k^2(1-3k)}{2k(3k-1)}$$

$$= \frac{-3k}{2}$$

2. MULTIPLYING AND DIVIDING RATIONAL EXPRESSIONS (practice questions text pg 133 #12 b,c #13 b,d)

- FACTOR FIRST !!!!

- for multiplication: multiply numerators together and multiply denominators together
- for division: flip the second rational expression and multiply
- don't forget to state restrictions ☺

a) $\frac{2x^2 - 5x - 3}{2x^2 - 5x + 2} \times \frac{2x^2 + 3x - 2}{x^2 - 4x + 3}$

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

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

b) $\frac{4m+8}{3m-3} \div \frac{2m+6}{7-7m}$

$$= \frac{4(m+2)}{3(m-1)} \times \frac{7(1-m)}{2(m+3)}$$

$$= \frac{-28(m+2)}{6(m+3)} = \frac{-14(m+2)}{3(m+3)}$$

3. ADDING AND SUBTRACTING RATIONAL EXPRESSIONS (practice questions text pg 133 #14 a,b,c,d)

- FACTOR DENOMINATORS (if possible) FIRST!!!!
- find a common denominator and adjust numerators appropriately
- keep common denominator (DO NOT TOUCH)
- add/subtract numerators....often you will need to expand by "FOIL" and "RAINBOW" first before gathering up the like terms in the numerator

$$a) \frac{5}{2x} + \frac{1+2x}{x} - \frac{8}{3x^3}$$

$$= \frac{15x^2}{6x^3} + \frac{6x(1+2x)}{6x^3} - \frac{16}{6x^3}$$

$$= \frac{15x^2 + 6x^2 + 12x^2 - 16}{6x^3}$$

$$= \frac{12x^3 + 21x^2 - 16}{6x^3}$$

$$b) \frac{2x+5}{x^2+3x+2} - \frac{x+4}{x^2+5x+6}$$

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

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

$$= \frac{2x^2 + 11x + 15 - x^2 - 5x - 4}{(x+2)(x+1)(x+3)}$$

$$= \frac{x^2 + 6x + 11}{(x+2)(x+1)(x+3)}$$

4. ORDER OF OPERATIONS RATIONAL EXPRESSIONS (practice questions text pg 133 #15 f)

- FOLLOW BEDMAS ☺

$$a) \frac{3x-3}{2x+2} \times \frac{5x-10}{3x-6} - \frac{x+4}{x^2-1}$$

$$= \frac{3(x-1)}{2(x+1)} \cdot \frac{5(x-2)}{3(x-2)} - \frac{(x+4)}{(x+1)(x-1)}$$

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

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

$$= \frac{5(x^2-2x+1)}{2(x+1)(x-1)} - 2x - 8$$

$$= \frac{5x^2 - 12x - 3}{2(x+1)(x-1)}$$

$$b) \frac{3k-2}{k+1} - \frac{2k^2+5k-3}{2k^3+8k^2+6k} \div \frac{2k^2-5k+2}{5k^2-9k-2}$$

$$= \frac{3k-2}{(k+1)} - \frac{(2k-1)(k+3)}{2k(k^2+4k+3)} \times \frac{(5k+1)(k-2)}{(2k-1)(k-2)}$$

$$= \frac{3k-2}{(k+1)} - \frac{(2k-1)(k+3)(5k+1)(k-2)}{2k(k+3)(k+1)(2k-1)(k-2)}$$

$$= \frac{3k-2}{(k+1)} - \frac{(5k+1)}{2k(k+1)}$$

$$= \frac{6k^2-4k}{2k(k+1)} - \frac{(5k+1)}{2k(k+1)}$$

$$= \frac{6k^2-4k-5k-1}{2k(k+1)}$$

$$= \frac{6k^2-9k-1}{2k(k+1)}$$