Math 3 Unit 4 Objective 2: Multiplying and Dividing Rational Expressions **NOTES**

Multiplying and dividing rational expressions use the same properties used to multiply and divide numerical fractions. If a, b, c, and d represent polynomials (where $b \neq 0$ and $d \neq 0$), then $\frac{a}{b} \cdot \frac{c}{d} = \frac{ac}{bd}$.

[1-4] What is the product?

1. $\frac{4x+8}{6x-10} \cdot \frac{15-9x}{x^2+6x+8}$

<u>Steps</u>

1. Completely factor the numerator and denominator (if possible)
   *gcf factoring
   *trinomial factoring
   *difference of squares

2. Rewrite as a single fraction

3. Divide out the common or opposite factor(s).

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

3. $\frac{4x^2}{3xy} \cdot \frac{x^2y^3}{6xy}$

4. $\frac{x^2y}{5x} \cdot \frac{15x^3y^2}{2x^2y^4}$

5. $\frac{x^3-8}{4-x^2} \cdot \frac{x^2+5x+6}{x^2+3x}$

Recall that $\frac{a}{b} \div \frac{c}{d} = \frac{a}{b} \cdot \frac{d}{c}$, where $b \neq 0$, $c \neq 0$ and $d \neq 0$. When you divide rational expressions, first rewrite the quotient as a product using the reciprocal before dividing out common factors.

[1-4] What is the quotient?

<u>Steps</u>

1. Completely factor the numerator and denominator (if possible)
   *gcf factoring
   *trinomial factoring
   *difference of squares

2. To divide by a rational expression, multiply by its reciprocal.

3. Rewrite as a single fraction

4. Divide out the common or opposite factor(s).

1. $\frac{x^2-25}{4x+28} \div \frac{x-5}{x^2+9x+14}$

2. $\frac{y+4}{y^2+5y+6} \div \frac{3y^2+12y}{2y^2+5y-3}$

3. $\frac{x^2}{3xy} \div \frac{x^2y^2}{6xy}$

4. $\frac{y^2+6x+8}{y^2+y-2} \div \frac{y+4}{2y+4}$

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