Warm-up:

Simplify each rational & state any restrictions.

1) $\frac{30x^4y^6z^2}{5xy^9z^3}$ $\frac{6x^3}{y^3z}$

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

3) $\frac{2x^2-18}{3x^2-27x+54}$

4) $\frac{x^3+8}{3x^2+7x+2}$

Unit 1 ~ Rationals & Radicals

Objective: A.APR.7

Day 10:

Multiplying & Dividing Rationals

Example 1: Simplify & State any restrictions.

$$\frac{4a}{5b} \cdot \frac{15b^2}{16a^3} = \frac{60ab^2}{80a^3b}$$

$$\frac{60}{80} \cdot \frac{a}{a^3} \cdot \frac{b^2}{b}$$

$$\frac{3}{4} \cdot a^{-2} \cdot b$$

$$\frac{3}{4} \cdot \frac{1}{a^2} \cdot \frac{b}{1} = \boxed{\frac{3b}{4a^2}}$$

$a \neq 0$

Example 2: Simplify & State any restrictions.

$$\frac{x^2 + x - 6}{x - 5} \cdot \frac{x^2 - 25}{x^2 + 4x + 3}$$

Steps.

1. Factored

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

2. Cancel common factors.

3. Simplify

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

$x \neq -1$

Your Turn: Simplify & State any restrictions.

$$\frac{2x - 8}{x^2 - 16} \cdot \frac{x^2 + 5x + 4}{x^2 + 8x + 16}$$

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

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

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

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

Example 3: Simplify & State any restrictions.

$$\frac{2 - x}{x^2 + 2x + 1} \div \frac{x^2 + 3x - 10}{x^2 - 1}$$

Steps

1. flip the right side and changed division to multiplication

$$\frac{2 - x}{x^2 + 2x + 1} \cdot \frac{x^2 - 1}{x^2 + 3x - 10}$$

2. factored

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

3. Cancel common factors $\frac{(18x-3)}{(18x-3)} = 1$

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

4. Simplify whats left.

$x \neq -1, -5$

Your Turn: Simplify & State any restrictions.

$$\frac{x^2 + 5x + 4}{x^2 + x - 12} \div \frac{x^2 - 1}{2x^2 - 6x}$$

Example 4: Simplify & State any restrictions.

$$\frac{\dfrac{r^2}{r^2 - 25s^2}}{\dfrac{r}{5s - r}}$$

Lesson Check

Do you know HOW?

Multiply or divide. State any restrictions on the variables.

3. $\dfrac{x^2 + 3x - 10}{x^2 + 4x - 12} \cdot \dfrac{3x + 18}{x + 3}$

4. $\dfrac{x^2 - 7x + 10}{x^2 - 8x + 15} \div \dfrac{4 - x^2}{x^2 + 3x - 18}$