

Simplifying Rational Expressions Notes

Learning Target: I can simplify rational expressions and state the excluded values for each expression.

Warm Up!

Factor the following polynomials.

a) $x^2 - 6x + 9$

$(x-3)(x-3)$

b) $4x^2 - 4$

$4(x^2 - 1)$

$4(x+1)(x-1)$

- Excluded Values (Restrictions) is talking about what x-values the expression CANNOT BE!!!
 - Remember, you can never divide by 0!!! (So denominator can't equal 0!!!)
- Always look for GCFs when simplifying rational expressions!

Simplify the following:

1. $\frac{3xy}{9x}$

$\frac{y}{x}$

2. $\frac{18a^2b^3}{4ab}$

$\frac{9AB^2}{2}$

Excluded Values (Restrictions): $x \neq 0$ Excluded Values (Restrictions): $A \neq 0$ $B \neq 0$

3. $\frac{5mnp^3}{25m^3np^4}$

$\frac{1}{5m^2p}$

4. $\frac{2x+6y}{2}$

$\frac{2(x+3y)}{2}$

$x + 3y$

Excluded Values (Restrictions): $m \neq 0, n \neq 0, p \neq 0$ Excluded Values (Restrictions):

$$5. \frac{45xyz + 60x^2yz^3}{10xy}$$

$$\frac{15 \cancel{xy} z (3 + 4xz^2)}{10 \cancel{xy}}$$

$$\frac{3z (3 + 4xz^2)}{2}$$

Excluded Values (Restrictions): $x \neq 0, y \neq 0$

$$7. \frac{x^2 + 4x - 5}{x^2 - 1}$$

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

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

Excluded Values (Restrictions): $x \neq -1, x \neq 1$

$$9. \frac{3x^2 + 16x + 5}{x^2 + 7x + 10}$$

$$\begin{array}{r} 15 \\ \times 1 \\ \hline 16 \end{array}$$

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

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

Excluded Values (Restrictions): $x \neq -2, x \neq -5$

$$6. \frac{x^2 + 5x + 6}{x + 2}$$

$$\frac{(x+3)(\cancel{x+2})}{(\cancel{x+2})}$$

$$(x+3)$$

Excluded Values (Restrictions): $x \neq -2$

$$8. \frac{2x^2 + 5x + 3}{2x^2 + 7x + 6}$$

$$\begin{array}{r} 2 \times 6 \\ \times 3 \\ \hline 5 \end{array}$$

$$\begin{array}{r} 4 \times 12 \\ \times 3 \\ \hline 7 \end{array}$$

$$\frac{(\cancel{2x+3})(x+1)}{(\cancel{2x+3})(x+2)}$$

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

Excluded Values (Restrictions): $x \neq -2, x \neq -3/2$

$$10. \frac{4x^2 - 16}{x^2 - 4}$$

$$\frac{4(\cancel{x^2 - 4})}{\cancel{x^2 - 4}}$$

$$4$$

Excluded Values (Restrictions): $x \neq -2, x \neq 2$