Simplifying Rational Expressions

Learning Goal: By the end of today,

(i) I will be able to recognize a rational expression and determine any restrictions

(ii) I will be able to use basic algebra skills to cancel terms and simplify a rational expression.

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Any algebraic expression that can be written as the quotient of two polynomials is called a rational expression.

$$\frac{6ab}{7c} \qquad \frac{(x+2)(x-3)}{7(x+2)}$$

Rational expressions cannot contain Roots of variables and they cannot contain variables in the exponent location.

$$\frac{3\sqrt{a}-8}{4x} \qquad \frac{3}{4^x+5}$$

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Restrictions - values the unknown quantity cannot be equal to

State the values of "x" that are restrictions.

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

Be careful...

$\frac{9(x-4)}{(x+4)(x-5)}$ $\frac{(x-2)}{x^2+6x+8}$

Restrictions ALWAYS come from the initial expression, before any canceling takes place

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Simplifying Rational Expressions

Case 1 - NO addition or subtraction is present in the expression

$\frac{14a^3b^6}{7a^2b^4}$

*everything is already in a multiplying or dividing state - cancel where appropriate

Case 2 - addition or subtraction is present in the expression

$\frac{4m-16}{5m-20}$

*factor first to create a multiplication situation, then cancel

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Simplify the following and state restrictions

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

$$\frac{x^2-16}{7(x-4)}$$

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Simplify the following and state restrictions

$$\frac{m^2+7mn+10n^2}{6m+12n}$$

$$\frac{5a^2b-15a^2}{10a^2(b^2+4)}$$

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Homework: page pg 112-13 #1-5ace, 10, challenge 16

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