

Multiplying and Dividing Rational Expressions

Minds On: Simplify!

$$2 \times \frac{1}{2}$$

$$2 \div \frac{1}{2}$$

$$\frac{3}{4} \times \frac{1}{8}$$

$$\frac{3}{4} \div \frac{1}{8}$$

$$\frac{5}{6} \times \frac{2}{3} \div \frac{1}{5}$$

$$5 \times \frac{3}{5} \div \frac{1}{3}$$

$$\frac{3}{8} \div \frac{1}{4} \times \frac{1}{2}$$

$$\frac{2}{3} \div \frac{5}{6} \div \frac{1}{4}$$

Example 1: Simplify and state the restrictions: $\frac{6x^2}{5xy} \times \frac{15xy^3}{8xy^4}$

To multiply rational expressions:

1. Factor the numerators and denominators, if possible
2. Divide out any factors that are common to the numerator and denominator
3. Multiply the numerators, multiply the denominators, and then write the result as a single rational expression

To divide rational expressions:

1. Multiply by the reciprocal of the divisor
2. Follow the steps for multiplication

To determine the restrictions:

1. Solve for the zeros of all the denominators in the factored expressions
2. If division, you must use solve for the zeros of the numerator AND denominator of the divisor

Example 2: Simplify and state the restrictions: $\frac{x^2-4}{(x+6)^2} \times \frac{x^2+9x+18}{2(2-x)}$

Example 3: Simplify and state the restrictions: $\frac{21p-3p^2}{16p+4p^2} \div \frac{14-9p+p^2}{12+7p+p^2}$