

Multiplying and Dividing Rational Expressions

Excluding Values / Placing Restriction: Values that make the expressions undefined

$$\frac{a}{b} \quad \text{Exclude Value: } b = 0, \quad \text{Restriction: } b \neq 0$$

$$\frac{a}{b} \div \frac{c}{d} \quad b, c, d \neq 0$$

Note:

- Reduce where possible
- Always factor first
- Check restrictions as soon as you factor (Restrictions always apply to original question.)

Example 1: Multiplying Rational Expressions

Simplify and state the restrictions

a) $\frac{3a^3}{2b^2} \times \frac{10b^3}{9a^2}$

b) $\frac{9x^2}{4xy} \bullet \frac{12xy^2}{3x}$

c) $\frac{x^2 + x - 6}{x^2 + 2x - 15} \times \frac{x - 3}{x - 2}$

Example 2: Dividing Rational Expressions

Simplify and state the restrictions

a) $\frac{2ab}{5c} \div \frac{14a^2b^2}{15c^2}$

b) $\frac{x^2 - x - 20}{x^2 - 6x} \div \frac{x^2 + 9x + 20}{x^2 - 12x + 36}$