

## Section 17 Multiplication and Division of Rational Expressions

To multiply rational expressions:

- Factor the numerator and denominator of each expression.
- Cancel common factors.
- Multiply the remaining factors - but leave in factored form.

**Example 1: Multiplying rational expressions.**

a)  $\frac{6a^2}{5b^2} \cdot \frac{10b}{3a}$

b)  $-\frac{5x^2}{3y^3} \cdot \frac{7y^2}{9x}$

c)  $\frac{x-6}{2x+5} \cdot \frac{2x}{6-x}$

d)  $\frac{x^2-25}{x^2-3x-10} \cdot \frac{x+2}{x}$

e)  $\frac{x^2-10x+25}{x^2-2x-15} \cdot \frac{x^2+6x+9}{2x^2+5x-3}$

To divide rational expressions:

- Invert the second expression and turn the problem into multiplication.
- Factor the numerator and denominator of each expression.
- Cancel common factors.
- Multiply the remaining factors - but leave in factored form.

**Example 2: Dividing rational expressions.**

a)  $\frac{6a^2}{5} \div \frac{3a}{x}$

b)  $\frac{5x^2}{3y^3} \div \frac{10x^2}{9y}$

c)  $\frac{3x^2 + 6x}{x} \div \frac{2x + 4}{x^2}$

d)  $\frac{x^2 - y^2}{x^2 - 2xy + y^2} \div \frac{x + y}{y - x}$

e)  $\frac{x^2 + 6x + 9}{2x^2 - 7x + 3} \div \frac{x^2 - 9}{x^2 - 6x + 9}$