

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Notes

Algebra Section 12.5

Pages 802-809

**Goal:** "You will multiply and divide rational expressions."



**Multiply expressions involving monomials:**

**Ex:**  $\frac{2x^2}{3x} \cdot \frac{6x^2}{12x^3}$

$$\frac{1}{3}$$

**Ex:**  $\frac{2y^3}{5y} \cdot \frac{15y^3}{8y^5}$

$$\frac{3}{4}$$

**Ex:**  $\frac{7z^2}{4z^3} \cdot \frac{z^3}{14z}$

$$\frac{z}{8}$$

**Ex:**  $\frac{3x^2}{2x} \cdot \frac{8x^3}{15x}$

$$\frac{4x^3}{5}$$

**Multiply Expressions Involving Polynomials:**

**Ex:**  $\frac{3x^2 + 3x}{4x^2 - 24x + 36} \cdot \frac{x^2 - 4x + 3}{x^2 - x}$

$$\frac{3x(x+1)}{4(x-3)(x-3)} \cdot \frac{(x-3)(x-1)}{x(x-1)}$$

$$\frac{3(x+1)}{4(x-3)}$$

**Ex:**  $\frac{5x}{x^2 + 5x + 6} \cdot (x+3)$

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

$$\frac{5x}{x+2}$$

**Ex:**  $\frac{x^2 + x - 2}{x^2 + 2x} \cdot \frac{2x^2 + 2x}{5x^2 - 15x + 10}$

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

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

**Ex:**  $\frac{2w^2}{w^2 - 7w + 12} \cdot (w-4)$

$$\frac{2w^2}{(w-4)(w-3)} \cdot \frac{(w-4)}{1}$$

$$\frac{2w^2}{w-3}$$

$$\text{Ex: } \frac{3x+6}{3x^2+18x+27} \cdot \frac{x^2-x-12}{x^2-4}$$

$$\frac{3(x+2)}{3(x+3)(x+3)} \cdot \frac{(x-4)(x+3)}{(x+2)(x-2)}$$

$$\frac{x-4}{(x+3)(x-2)}$$

$$\text{Ex: } \frac{4x^2}{x^2+3x-10} \cdot (x-2)$$

$$\frac{4x^2}{(x+5)(x-2)} \cdot \frac{(x-2)}{1}$$

$$\frac{4x^2}{x+5}$$

### Divide Rational Expressions:

$$\text{Ex: } \frac{7x^2-7x}{x^2+2x-3} \div \frac{x+1}{x^2-7x-8}$$

$$\frac{7x(x-1)}{(x+3)(x-1)} \cdot \frac{(x-8)(x+1)}{x+1}$$

$$\frac{7x(x-8)}{x+3}$$

$$\text{Ex: } \frac{x^2-9}{x^2+5x+6} \div \frac{4x^2-12x}{x^2-2x-8}$$

$$\frac{(x-3)(x+3)}{(x+3)(x+2)} \cdot \frac{(x-4)(x+2)}{4x(x-3)}$$

$$\frac{x-4}{4x}$$

$$\text{Ex: } \frac{m^2-4}{2m^2+4m} \div \frac{6m-3m^2}{4m+44}$$

$$\frac{(m+2)(m-2)}{2m(m+2)} \cdot \frac{4(m+11)}{3m(2-m)}$$

$$\frac{-2(m+11)}{3m^2}$$

$$\text{Ex: } \frac{n^2-6n+9}{12n} \div (n-3)$$

$$\frac{(n-3)(n-3)}{12n} \cdot \frac{1}{n-3}$$

$$\frac{n-3}{12n}$$

$$\text{Ex: } \frac{2x^2+16x+24}{3x^2} \div (x+6)$$

$$\frac{2(x+6)(x+2)}{3x^2} \cdot \frac{1}{x+6}$$

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

$$\text{Ex: } \frac{3x^2+24x+36}{6x+9} \div (x+2)$$

$$\frac{3(x+2)(x+6)}{3(2x+3)} \cdot \frac{1}{x+2}$$