

## Lesson 2 Multiplying Rational Expressions

Rational expressions can be multiplied in a similar way that rational numbers are multiplied.

Divide first  $\frac{\overset{1}{\cancel{3}}}{5} \times \frac{\overset{1}{\cancel{5}}}{\cancel{6}_2} = \frac{1}{10}$

**Steps for Multiplying:**

- Completely factor all numerators and denominators.
- State restrictions. Restrictions are based on the original expression, not the simplified expression.
- Divide the numerators and denominators by any common factors.
- State simplified final answer.

**Examples**

Simplify each expression and state restrictions.

1.  $\frac{\overset{1}{\cancel{3}b^2}}{5\cancel{a}} \times \frac{2\cancel{a}}{\cancel{9}_3}$        $a \neq 0$

$$\frac{2b^2}{15}$$

2.  $(\cancel{x+2}) \cdot \frac{\overset{1}{\cancel{2}x^2}}{3x} \cdot \frac{5(x-4)}{\cancel{8x(x+2)}_4}$        $x \neq -2, 0$

$$\frac{5(x-4)}{12}$$

3.  $\frac{x^2+x-6}{x^2+2x-15} \cdot \frac{x-3}{x-2}$

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

$$\frac{x+3}{x+5}$$

$x \neq -5, 2, 3$

# L2 Multiplying Rational Expressions.notebook

## Pre-Calculus 11 Enriched Rational Expressions & Equations

4.  $\frac{x^2 - x - 20}{x^2 - 6x} \cdot \frac{x^2 - 12x + 36}{x^2 + 9x + 20}$

$$\frac{\cancel{(x-5)}\cancel{(x+4)}}{x\cancel{(x-6)}} \cdot \frac{\cancel{(x-6)}(x-6)}{\cancel{(x+4)}(x+5)}$$

$$\frac{(x-5)(x-6)}{x(x+5)}$$

$x \neq -5, -4, 0, 6$

5.  $\frac{4-x^2}{5x-10} \cdot \frac{x-5}{3x-15}$

$$\frac{-(x^2-4)}{5x-10} \cdot \frac{x-5}{3x-15}$$

$x \neq 2, 5$

GCF

Diff of squares

PSF

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

$$\frac{-(x+2)}{15}$$

6.  $\frac{3x^2 - 5x - 2}{6x} \cdot \frac{4x^2 - 8x}{x^2 - 4x + 4}$

P -6  
S -5  
F -6, 1/3

$$\frac{(3x+1)\cancel{(x-2)}}{3\cancel{6x}} \cdot \frac{\cancel{4x}\cancel{(x-2)}}{\cancel{(x-2)}\cancel{(x-2)}}$$

$x \neq 0, 2$

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

worksheet

# 1, 6, 8, 9, 11,

13, 15, 17, 18