

# Rational Expressions

## Key Points:

- Rational Expression is the quotient of two polynomial expressions
- Rational expressions can be simplified by cancelling common factors in the numerator and denominator.
- We can multiply rational expressions by multiplying the numerators and multiplying the denominators.
- To divide rational expressions, multiply by the reciprocal of the second expression.
- Adding or subtracting rational expressions requires finding a common denominator.
- Complex rational expressions have fractions in the numerator or the denominator. These expressions can be simplified.

## Rational Expressions Video

- [Simplifying Rational Expressions](#)
- [Multiplying Rational Expressions](#)
- [Dividing Rational Expressions](#)
- [Adding and Subtracting Rational Expressions](#)
- [Simplifying Complex Rational Expressions](#)

## Practice Exercises

For the following exercises, simplify the expression:

1. 
$$\frac{x^2 - x - 12}{x^2 - 8x + 16}$$

2. 
$$\frac{4y^2 - 25}{4y^2 - 20y + 25}$$

3. 
$$\frac{2a^2 - a - 3}{2a^2 - 6a - 8} \cdot \frac{5a^2 - 19a - 4}{10a^2 - 13a - 3}$$

4. 
$$\frac{d-4}{d^2-9} \cdot \frac{d-3}{d^2-16}$$

5. 
$$\frac{m^2+5m+6}{2m^2-5m-3} \div \frac{2m^2+3m-9}{4m^2-4m-3}$$

6. 
$$\frac{4d^2-7d-2}{6d^2-17d+10} \div \frac{8d^2+6d+1}{6d^2+7d-10}$$

7. 
$$\frac{10}{x} + \frac{6}{y}$$

8. 
$$\frac{12}{a^2+2a+1} - \frac{3}{a^2-1}$$

9. 
$$\frac{\frac{1}{d} + \frac{2}{c}}{\frac{6c+12d}{dc}}$$

10. 
$$\frac{\frac{3}{x} - \frac{7}{y}}{\frac{2}{x}}$$

## Answers:

1.  $\frac{x+3}{x-4}$

2.  $\frac{2y+5}{2y-5}$

3.  $\frac{1}{2}$

4.  $\frac{1}{(d+3)(d+4)}$

5.  $\frac{m+2}{m-1}$

6.  $\frac{d+2}{2d+1}$

7.  $\frac{10y+6x}{xy}$

8.  $\frac{3(3a-5)}{(a+1)^2(a-1)}$

9.  $\frac{1}{6}$

10.  $\frac{3y-7x}{2y}$