

An expression of the form  $\frac{\text{polynomial}}{\text{polynomial}}$  is a **rational expression**.

Like a numerical fraction, a rational expression is undefined when the denominator is 0. A value of a variable for which a rational expression is undefined is an **excluded value**.

An **Excluded Value** places a *restriction* on the domain of the expression as these values result in the expression being undefined.

### Problem 1 Simplifying a Rational Expression

**Got It?** What is the simplified form of the expression? State any excluded values.

a.  $\frac{21a^2}{7a^3}$

b.  $\frac{18d^2}{4d + 8}$

c.  $\frac{2n - 3}{6n - 9}$

d.  $\frac{26c^3 + 91c}{2c^2 + 7}$

**Practice** Simplify each expression. State any excluded values.

1.  $\frac{4x^3}{28x^4}$

2.  $\frac{3x^2 - 9x}{x - 3}$

**Problem 2** Simplifying a Rational Expression Containing a Trinomial**A Practice** Simplify each expression. State any excluded values.

3.  $\frac{c^2 - 6c + 8}{c^2 + c - 6}$

4.  $\frac{m + 4}{m^2 + 2m - 8}$

**Problem 3** Recognizing Opposite Factors**A Practice** Simplify each expression. State any excluded values.

5.  $\frac{m - 2}{4 - 2m}$

6.  $\frac{4 - w}{w^2 - 8w + 16}$

**Problem 4** Using a Rational Expression**Got It?** a. A square has side length  $6x + 2$ . A rectangle with width  $3x + 1$  has the same area as the square. What is the length of the rectangle?



- Practice** 7. **Geometry** The length of a rectangular prism is 5 more than twice the width  $w$ . The volume of the prism is  $2w^3 + 7w^2 + 5w$ . What is a simplified expression for the height of the prism?

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8. **Geometry** Rectangle A has length  $2x + 6$  and width  $3x$ . Rectangle B has length  $x + 2$  and an area 12 square units greater than Rectangle A's area. What is a simplified expression for the width of Rectangle B?
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