

EXAMPLE 4 Subtract with unlike denominators

Subtract: $\frac{x+2}{2x-2} - \frac{-2x-1}{x^2-4x+3}$

Solution

$$\frac{x+2}{2x-2} - \frac{-2x-1}{x^2-4x+3}$$

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

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

$$= \frac{x^2-x-6}{2(x-1)(x-3)} - \frac{-4x-2}{2(x-1)(x-3)}$$

$$= \frac{x^2-x-6 - (-4x-2)}{2(x-1)(x-3)}$$

$$= \frac{x^2+3x-4}{2(x-1)(x-3)}$$

$$= \frac{(x-1)(x+4)}{2(x-1)(x-3)}$$

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

Factor denominators.

LCD is $2(x-1)(x-3)$.

Multiply.

Subtract numerators.

Simplify numerator.

Factor numerator.
Divide out common factor.

Simplify.

AVOID ERRORS

After you simplify the numerator, check to see if the numerator has a factor in common with the denominator. If so, the expression can be simplified further.

**GUIDED PRACTICE** for Examples 2, 3, and 4

Find the least common multiple of the polynomials.

5. $5x^3$ and $10x^2 - 15x$

6. $8x - 16$ and $12x^2 + 12x - 72$

Perform the indicated operation and simplify.

7. $\frac{3}{4x} - \frac{1}{7}$

8. $\frac{1}{3x^2} + \frac{x}{9x^2 - 12x}$

9. $\frac{x}{x^2 - x - 12} + \frac{5}{12x - 48}$

10. $\frac{x+1}{x^2+4x+4} - \frac{6}{x^2-4}$

KEY CONCEPT*For Your Notebook***Simplifying Complex Fractions**

A **complex fraction** is a fraction that contains a fraction in its numerator or denominator. A complex fraction can be simplified using either of the methods below.

Method 1: If necessary, simplify the numerator and denominator by writing each as a single fraction. Then divide the numerator by the denominator.

Method 2: Multiply the numerator and the denominator by the least common denominator (LCD) of every fraction in the numerator and denominator. Then simplify.