

**8-2 Skills Practice****Adding and Subtracting Rational Expressions**

Find the LCM of each set of polynomials.

1.  $12c, 6c^2d$

2.  $18a^3bc^2, 24b^2c^2$

3.  $2x - 6, x - 3$

4.  $5a, a - 1$

5.  $t^2 - 25, t + 5$

6.  $x^2 - 3x - 4, x + 1$

Simplify each expression.

7.  $\frac{3}{x} + \frac{5}{y}$

8.  $\frac{3}{8p^2q} + \frac{5}{4p^2q}$

9.  $\frac{2c - 7}{3} + 4$

10.  $\frac{2}{m^2n} + \frac{5}{n}$

11.  $\frac{12}{5y^2} - \frac{2}{5yz}$

12.  $\frac{7}{4gh} + \frac{3}{4h^2}$

13.  $\frac{2}{a + 2} - \frac{3}{2a}$

14.  $\frac{5}{3b + d} - \frac{2}{3bd}$

15.  $\frac{3}{w - 3} - \frac{2}{w^2 - 9}$

16.  $\frac{3t}{2 - x} + \frac{5}{x - 2}$

17.  $\frac{m}{m - n} - \frac{m}{n - m}$

18.  $\frac{4z}{z - 4} + \frac{z + 4}{z + 1}$

19.  $\frac{1}{x^2 + 2x + 1} + \frac{x}{x + 1}$

20.  $\frac{2x + 1}{x - 5} - \frac{4}{x^2 - 3x - 10}$

21.  $\frac{n}{n - 3} + \frac{2n + 2}{n^2 - 2n - 3}$

22.  $\frac{3}{y^2 + y - 12} - \frac{2}{y^2 + 6y + 8}$

## 8-2 Study Guide and Intervention (continued) Adding and Subtracting Rational Expressions

**Add and Subtract Rational Expressions** To add or subtract rational expressions, follow these steps.

- Step 1 If necessary, find equivalent fractions that have the same denominator.
- Step 2 Add or subtract the numerators.
- Step 3 Combine any like terms in the numerator.
- Step 4 Factor if possible.
- Step 5 Simplify if possible.

**EXAMPLE** Simplify  $\frac{6}{2x^2 + 2x - 12} - \frac{2}{x^2 - 4}$ .

$$\begin{aligned} & \frac{6}{2x^2 + 2x - 12} - \frac{2}{x^2 - 4} \\ &= \frac{6}{2(x+3)(x-2)} - \frac{2}{(x-2)(x+2)} \\ &= \frac{6(x+2)}{2(x+3)(x-2)(x+2)} - \frac{2 \cdot 2(x+3)}{2(x+3)(x-2)(x+2)} \\ &= \frac{6(x+2)}{2(x+3)(x-2)(x+2)} - \frac{4(x+3)}{2(x+3)(x-2)(x+2)} \\ &= \frac{6x+12}{2(x+3)(x-2)(x+2)} - \frac{4x+12}{2(x+3)(x-2)(x+2)} \\ &= \frac{2x}{2(x+3)(x-2)(x+2)} \\ &= \frac{x}{(x+3)(x-2)(x+2)} \end{aligned}$$

Factor the denominators.  
The LCD is  $2(x+3)(x-2)(x+2)$ .  
Subtract the numerators.  
Distributive Property  
Combine like terms.  
Simplify.

**EXERCISES**

Simplify each expression.

- $\frac{-7xy}{3x} + \frac{4y^2}{2y} - \frac{y}{3}$
- $\frac{2}{x-3} - \frac{1}{x-1} - \frac{x+1}{(x-1)(x-3)}$
- $\frac{4x}{3bc} - \frac{15b}{5ac} - \frac{4a^2 - 9b^2}{3abc}$
- $\frac{3x+3}{x^2+2x+1} + \frac{x-1}{x^2-1} - \frac{4}{x+1}$
- $\frac{4}{4x^2-4x+1} - \frac{5x}{20x^2-5} - \frac{-2x^2+9x+4}{(2x+1)(2x-1)^2}$

## 8-2 Skills Practice Adding and Subtracting Rational Expressions

Find the LCM of each set of polynomials.

- $12a, 6c^2d, 12c^2d$
- $18a^3bc^2, 24b^2c^2, 72a^3b^2c^2$
- $2x - 6, x - 3, 2(x - 3)$
- $5a, a - 1, 5a(a - 1)$
- $x^2 - 25, t + 5, (t + 5)(t - 5)$
- $x^2 - 3x - 4, x + 1, (x - 4)(x + 1)$

Simplify each expression.

- $\frac{3}{x} + \frac{5x+3y}{xy}$
- $\frac{2c-7}{3} + 4\frac{2c+5}{3}$
- $\frac{12}{5y^2} - \frac{2}{5y^2} - \frac{12z-2y}{5y^2}$
- $\frac{2}{a+2} - \frac{3}{a-2} - \frac{a-6}{2a(a+2)}$
- $\frac{3}{w-3} - \frac{2}{w^2-9} - \frac{3w+7}{(w-3)(w+3)}$
- $\frac{m}{m-n} - \frac{n}{n-m} - \frac{2m}{m-n}$
- $\frac{1}{x^2+2x+1} + \frac{x}{x+1} - \frac{x^2+x+1}{(x+1)^2}$
- $\frac{n}{n-3} + \frac{2n+2}{n^2-2n-3} - \frac{n+2}{n-3}$
- $\frac{3}{8y^2q} + \frac{5}{4y^2q} - \frac{13}{8p^2q}$
- $\frac{2}{m^2n} + \frac{5}{n} - \frac{2+5m^2}{m^2n}$
- $\frac{7}{4gh} + \frac{3}{4h^2} - \frac{7h+3g}{4gh^2}$
- $\frac{5}{3b+d} - \frac{2}{3bd} - \frac{15bd-6b-2d}{3bd(3b+d)}$
- $\frac{3}{2-x} - \frac{2}{x-2} + \frac{5}{x-2} - \frac{5-3t}{x-2}$
- $\frac{4z}{z-4} - \frac{z+4}{z+1} - \frac{5z^2+4z-16}{(z-4)(z+1)}$
- $\frac{2x+1}{x-5} - \frac{4}{x^2-3x-10} - \frac{2x^2+5x-2}{(x-5)(x+2)}$
- $\frac{3}{y^2+y-12} - \frac{2}{y^2+6y+8} - \frac{y+12}{(y+4)(y-3)(y+2)}$