

**Example 4**  
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Simplify each difference.

16.  $\frac{-2}{x} - \frac{1}{x}$

18.  $\frac{y}{2y+4} - \frac{3}{y+2}$

20.  $\frac{3y}{y^2-25} - \frac{8}{y-5}$

17.  $\frac{-5y}{2y-1} - \frac{y+3}{2y-1}$

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

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

**Example 5**  
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Simplify each complex fraction.

22.  $\frac{\frac{1}{x}}{\frac{2}{y}}$

23.  $\frac{1 - \frac{1}{4}}{2 - \frac{3}{5}}$

24.  $\frac{\frac{2}{x+y}}{3}$

25.  $\frac{\frac{1}{3}}{\frac{b}{3}}$

26.  $\frac{1}{1 + \frac{x}{y}}$

27.  $\frac{3}{\frac{2}{x} + y}$

28.  $\frac{\frac{2}{x+y}}{\frac{5}{x+y}}$

29.  $\frac{\frac{3}{x-4}}{1 - \frac{2}{x-4}}$

30.  $\frac{-3}{\frac{5}{x} + y}$

**3 Apply Your Skills**

Add or subtract. Simplify where possible.

31.  $\frac{3}{4x} - \frac{2}{x^2}$

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

33.  $\frac{2x}{x^2-1} - \frac{1}{x^2}$

34.  $\frac{4}{x^2-9} + \frac{7}{x+3}$

35.  $\frac{x+2}{x-1} - \frac{x-3}{2x+1}$

36.  $\frac{x}{2x^2-x} + \frac{1}{2x}$

37.  $\frac{5x}{x^2-x-6} - \frac{4}{x^2+4x+4}$

38.  $3x + \frac{x^2+5x}{x^2-2}$

39.  $4y - \frac{y+2}{y^2+3y}$

40.  $\frac{5y}{y^2-7y} - \frac{4}{2y-14} + \frac{9}{y}$

41. **Open-Ended** Write two rational expressions whose sum is  $\frac{x-2}{x+4}$ .

42. **Writing** Explain how factoring is used when adding or subtracting rational expressions. Include an example in your explanation.

43. **Error Analysis** How would you convince a student that  $\frac{7x+25}{x^2-9}$  is *not* the sum of  $\frac{4}{x^2-9}$  and  $\frac{7}{x+3}$ ?

Simplify each complex fraction.

44.  $\frac{\frac{2}{x} + \frac{3}{y}}{\frac{-5}{x} + \frac{7}{y}}$

45.  $\frac{\frac{5}{x} - \frac{2}{y}}{\frac{-4}{x} - \frac{6}{y}}$

46.  $\frac{1 + \frac{2}{x}}{2 + \frac{3}{2x}}$

47.  $\frac{\frac{1}{xy} - \frac{1}{y^2}}{\frac{1}{x^2y} - \frac{1}{xy^2}}$

48.  $\frac{\frac{2}{x+4} + 2}{1 + \frac{3}{x+4}}$

49.  $\frac{\frac{3}{x-2} - 5}{2 - \frac{4}{x-2}}$

50. **Open-Ended** Write two different complex fractions that simplify to  $\frac{x-2}{x+4}$ .

51. **Critical Thinking** What real numbers are not in the domain of function  $f$ ? Explain.

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

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