

**EXAMPLE 1**

on p. 589  
for Exs. 4–13

**CROSS MULTIPLYING** Solve the equation by cross multiplying. Check for extraneous solutions.

4.  $\frac{4}{2x} = \frac{5}{x+6}$

5.  $\frac{9}{3x} = \frac{4}{x+2}$

6.  $\frac{6}{x-1} = \frac{9}{x+1}$

7.  $\frac{8}{3x-2} = \frac{2}{x-1}$

8.  $\frac{x}{x+1} = \frac{3}{x+1}$

9.  $\frac{x-3}{x+5} = \frac{x}{x+2}$

10.  $\frac{x}{x^2-2} = \frac{-1}{x}$

11.  $\frac{4(x-4)}{x^2+2x-8} = \frac{4}{x+4}$

12.  $\frac{9}{x^2-6x+9} = \frac{3x}{x^2-3x}$

13. **MAKES REASONING** What is the solution of  $\frac{3}{x+2} = \frac{6}{x-1}$ ?

(A) -5

(B) -4

(C) -1

(D) 4

**EXAMPLES 3, 4, and 5**

on pp. 590–591  
for Exs. 14–27

**LEAST COMMON DENOMINATOR** Solve the equation by using the LCD. Check for extraneous solutions.

14.  $\frac{4}{x} + x = 5$

15.  $\frac{2}{3x} + \frac{1}{6} = \frac{4}{3x}$

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

17.  $\frac{1}{2x} + \frac{3}{x+7} = \frac{-1}{x}$

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

19.  $\frac{5}{x^2+x-6} = 2 + \frac{x-3}{x-2}$

20.  $\frac{x+1}{x+6} + \frac{1}{x} = \frac{2x+1}{x+6}$

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

22.  $\frac{6x}{x+4} + 4 = \frac{2x+2}{x-1}$

23.  $\frac{10}{x} + 3 = \frac{x+9}{x-4}$


24.  $\frac{18}{x^2-3x} - \frac{6}{x-3} = \frac{5}{x}$

25.  $\frac{x+3}{x-3} + \frac{x}{x-5} = \frac{x+5}{x-5}$

**ERROR ANALYSIS** Describe and correct the error in the first step of solving the equation.


26.

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

$$3x^2 + 8x = 1$$


27.

$$\frac{5}{x} + \frac{23}{6} = \frac{45}{x}$$

$$\frac{28}{x+6} = \frac{45}{x}$$


28. **MAKES REASONING** What is (are) the solution(s) of  $\frac{2}{x-3} = \frac{1}{x^2-2x-3}$ ?

(A)  $-3, -\frac{1}{2}$

(B)  $-\frac{1}{2}, 3$

(C)  $-\frac{1}{2}$

(D) 3

29. **OPENS ENDOURMENT** Give an example of a rational equation that you would solve using cross multiplication. Then give an example of a rational equation that you would solve by multiplying each side by the LCD of the fractions.

**CHALLENGE** In Exercises 30–32,  $a$  is a nonzero real number. Tell whether the algebraic statement is *always true*, *sometimes true*, or *never true*. Explain your answer.

30. For the equation  $\frac{1}{x-a} = \frac{x}{x-a}$ ,  $x = a$  is an extraneous solution.

31. The equation  $\frac{3}{x-a} = \frac{x}{x-a}$  has exactly one solution.

32. The equation  $\frac{1}{x-a} = \frac{2}{x+a} + \frac{2a}{x^2-a^2}$  has no solution.