

8.6 Solve Rational Equations

pp. 589–595

EXAMPLE

Solve: $\frac{3x}{x+1} + \frac{6}{2x} = \frac{7}{x}$

The least common denominator is $2x(x+1)$.

$$\frac{3x}{x+1} + \frac{6}{2x} = \frac{7}{x}$$

Write original equation.

$$2x(x+1)\left(\frac{3x}{x+1} + \frac{6}{2x}\right) = 2x(x+1) \cdot \frac{7}{x}$$

Multiply each side by the LCD, $2x(x+1)$.

$$2x(3x) + 6(x+1) = 2(x+1)(7)$$

Simplify.

$$6x^2 + 6x + 6 = 14x + 14$$

Simplify.

$$6x^2 - 8x - 8 = 0$$

Write in standard form.

$$3x^2 - 4x - 4 = 0$$

Divide each side by 2.

$$(3x+2)(x-2) = 0$$

Factor.

$$3x+2=0 \quad \text{or} \quad x-2=0$$

Zero product property

$$x = -\frac{2}{3} \quad \text{or} \quad x = 2$$

Solve for x .

► The solutions are $-\frac{2}{3}$ and 2. Check these in the original equation to make sure neither solution is extraneous.

EXERCISES

Solve the equation by cross multiplying. Check your solution(s).

26. $\frac{2x}{9} = \frac{2}{x}$

27. $\frac{5}{x} = \frac{7}{x+2}$

28. $\frac{x-1}{4} = \frac{3x}{9}$

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

30. $\frac{x+12}{3} = \frac{2x+3}{x+2}$

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

Solve the equation by using the LCD. Check for extraneous solutions.

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

33. $\frac{8(x-1)}{x^2-4} = \frac{4}{x+2}$

34. $\frac{3x}{x+1} = \frac{12}{x^2-1} + 2$

35. $\frac{2(x+7)}{x+4} - 2 = \frac{2x+20}{2x+8}$

36. **BASKETBALL** So far this season, a basketball player has made 60 of 75 free-throw attempts.

- Write a rational expression that represents the player's free-throw percentage (expressed as a decimal) if she makes her next x free throws.
- How many consecutive free throws must the player make in order to raise her free-throw percentage to at least 82%?

EXAMPLES
1, 4, and 5on pp. 589–591
for Exs. 26–36