Section 7.5 Solving Equations Containing Rational Expressions

# Objective 1: Solving Equations Containing Rational Expressions

In previous sections, we worked with rational expressions. We will now solve equations that contain rational expressions.

For example, $\frac{x^{2}+5}{x}$ and $\frac{21}{x}$ are both examples of rational expressions. Therefore, $\frac{x^{2}+5}{x}=\frac{21}{x}$ is a **rational equation**.

To solve equations containing rational expressions, first clear the equation of fractions by multiplying both sides of the equation by the least common denominator (LCD) of all rational expressions. Then solve the resulting equation.

Solve the equation.

a. $\frac{x^{2}+5}{x}=\frac{21}{x}$

The solutions to the resulting equation are only possible solutions to the original equation and must be checked. Recall that when the denominator of a rational expression contains a variable, that expression is undefined for values of the variable that make the denominator $0$. If a proposed solution makes the denominator of any rational expression in the equation $0$, then it must be rejected as a solution of the original equation. Such proposed solutions are called **extraneous solutions**.

In the example above, the proposed solutions are $-4$ and $4$. Since neither value results in a value of $0$ in the denominator, both are solutions to the original equation.

Solve the equation.

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| b.$ \frac{n+4}{n+3}=\frac{1}{n+3}$  | c. $\frac{6}{x}+\frac{1}{5}=\frac{8}{x}$ |

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| d. $\frac{4}{t-4}-\frac{5t}{t^{2}-16}=\frac{3}{t+4}$ | e. $\frac{x-5}{x^{2}+7x+10}=\frac{2}{3x+15}-\frac{2}{x+2}$ |

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| --- | --- |
| f. $\frac{w^{2}-2}{3w^{2}-11w+10}=\frac{2}{w-2}+\frac{3}{3w-5}$ | g. $\frac{-13}{4a+1}+4=a$ |