Section 7.6 Rational Equations and Problem Solving

# Objective 1: Solving Equations with Rational Expressions for a Specified Variable

In the previous section, we solved equations that contained rational expressions. Here we will use the same strategies to solve rational equations that contain more than one variable for a specified variable.

Just as in section 7.5, the first step is to identify the LCD and multiply both sides of the equation by it.

Solve for $r$.

|  |  |
| --- | --- |
| a. $\frac{1}{5}=\frac{1}{r}+\frac{1}{3}$  | b. $\frac{1}{x}=\frac{1}{r}+\frac{1}{v}$ |

# Objective 2: Solving Problems Modeled by Equations with Rational Expressions

Problem solving sometimes involves modeling a described situation with an equation containing rational expressions. For problems such as these setting up a table can be an effective way to organize the information.

a. The speed of a stream is $4$ mph. A boat travels $3$ miles upstream in the same time it takes to travel $11$ miles downstream. What is the speed of the boat in still water?

|  |  |  |  |
| --- | --- | --- | --- |
|  | Distance | Rate | Time |
| Upstream |  |  |  |
| Downstream |  |  |  |

b. One hose can fill a goldfish pond in $84$ minutes, and two hoses can fill the same pond in $35$ minutes. Find how long it takes the second hose alone to fill the pond.

|  |  |  |
| --- | --- | --- |
|  | Minutes to complete the job | Part of the job completed in $1$ minute |
| First hose |  |  |
| Together |  |  |
| Second hose |  |  |

c. A plane flies $440$ miles with the wind and $340$ miles against the wind in the same length of time. If the speed of the wind is $25$ mph, find the speed of the plane in still air.