Multiplying both sides of the equation by the LCD results in the following.

$$(z+9)\frac{z^2}{z+9} = (z+9)\frac{-13z-36}{z+9}$$
$$z^2 = -3z - 36$$
$$z^2 + 13z + 36 = 0$$

The resulting quadratic equation can be solved by factoring.

$$z^2 + 13z + 36 = 0$$
$$(z+9)(z+4) = 0$$
$$z = -4, \cancel{-9}$$

Since it was determined earlier that –9 must be excluded as a solution to this rational equation, the solution is –4.

1.R.4 Exercises

Concept Check

True/False. Determine whether each statement is true or false. If a statement is false, explain how it can be changed so the statement will be true. (**Note:** There may be more than one acceptable change.)

1. A proportion is a statement that two ratios are being multiplied.

2. Cross canceling is used to determine if a proportion is true.

3. In order to solve the proportion $\frac{16}{36.8} = \frac{x}{27.6}$ we construct the equation $36.8x = 441.6$.

4. When using proportions to solve a word problem, there is only one correct way to set up the proportion.

5. The proportions $\frac{36 \text{ tickets}}{\$540} = \frac{x \text{ tickets}}{\$75}$ and $\frac{x \text{ tickets}}{36 \text{ tickets}} = \frac{\$75}{\$540}$ will yield the same answer.

Practice

Determine whether each proportion is true or false.

6. $\frac{3}{6} = \frac{4}{8}$

7. $\frac{1}{3} = \frac{33}{100}$

Solve each proportion.

8. $\frac{5}{4} = \frac{x}{8}$

9. $\frac{3.5}{2.6} = \frac{10.5}{B}$

Applications

Solve.

10. ***Concrete:*** The quality of concrete is based on the ratio of bags of cement to cubic yards of gravel. One batch of concrete consists of 27 bags of cement mixed into 9 cubic yards of gravel, while a second has 15 bags of cement mixed with 5 cubic yards of gravel. Determine whether the ratio of cement to gravel is the same for both batches.

11. ***Grading:*** An English teacher must read and grade 27 essays. If the teacher takes 20 minutes to read and grade 3 essays, how much time will he need to grade all 27 essays?

Writing & Thinking

12. In your own words, clarify how you can know that a proportion is set up correctly or not.