

Solution

$$\begin{aligned}
 \left(\frac{f}{g}\right)(x) &= \frac{f(x)}{g(x)} \\
 &= \frac{x^2 - 25}{\frac{x}{x+5}} \\
 &= \frac{x^2 - 25}{x} \cdot \frac{2x}{x+5} \\
 &= \frac{\cancel{(x+5)}(x-5)2\cancel{x}}{x\cancel{(x+5)}} \\
 &= \frac{2(x-5)}{1} \\
 &= 2x - 10
 \end{aligned}$$

4.R.6 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.)

- The reciprocal of $\frac{x}{x+3}$ is $\frac{-x-3}{x}$.
- Dividing rational expressions is similar to dividing fractions.
- There are no restrictions on the denominator $12x^2$.
- Because $\frac{4x^2}{16x}$ reduces to $\frac{x}{4}$, there are no restrictions on the denominator.

Practice

Perform the indicated operations and reduce to lowest terms. Assume that no denominator has a value of 0.

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

$$6. \frac{2x^2 + x - 3}{x^2 + 4x} \cdot \frac{2x + 8}{x - 1}$$

$$7. \frac{x - 1}{6x + 6} \div \frac{2x - 2}{x^2 + x}$$

$$8. \frac{x + 3}{x^2 + 3x - 4} \div \frac{x + 2}{x^2 + x - 2}$$

Applications

Solve

- 9. Carpentry:** Erik is building a cubby bookshelf, that is, a bookshelf divided into storage holes (cubbies) instead of shelves. He wants the height of the bookshelf to be $x^2 - 3x - 10$ and the width to be $x^2 + 5x + 6$. Each cubby hole in the bookshelf will have a height of $x + 3$ and a width of $x - 5$.
- Write a rational expression to determine how many cubbies high the bookshelf will be.
 - Write a rational expression to determine how many cubbies wide the bookshelf will be.
 - Multiply the rational expressions from Parts **a.** and **b.** (and reduce to lowest terms) to obtain a rational expression that gives the total number of cubbies in the entire bookshelf.