

Multiplying, Dividing, and Simplifying Rational Functions

1. Simplify each of the rational expressions below. If there is only one variable, it is important to note any restrictions on the simplified version of the expression.

a) $\frac{18t^3}{6t}$

b) $(x+2)\frac{x-6}{x+2}$

c) $\frac{(3x+2)(x-7)}{x(x-7)}$

d) $\frac{x^2+5x+4}{x^2+2x-8}$

e) $\frac{2}{x-3} \cdot \frac{x}{x+1}$

f) $\frac{x+1}{y-2} \div \frac{2x+2}{y-2}$

g) $\frac{x^2+x}{2x+6} \div \frac{x}{x+3}$

h) $\frac{4z^2}{r^3} \cdot \frac{5r}{2z} \cdot \frac{r}{z}$

i) $\frac{(x-5)(x+3)}{3x-1} \cdot \frac{x(3x-1)}{x-5}$

j) $\frac{x^2+4x+4}{(x-3)(x^2-1)} \cdot \frac{x^2-2x-3}{x^2-4}$

k) $\frac{x^2+x-12}{2x^2-9x-5} \div \frac{x^2+7x+12}{2x^2-7x-4}$

l) $\frac{x+1}{y-2} \div \frac{2x+2}{y-2} \div \frac{x-3}{x}$

2. The area of a rectangle is $5x^2 + 12x + 4$ and its width W is $x + 2$. Find (and simplify) the length L of the rectangle. (In general, $A = LW$. So that means $L = \frac{A}{W}$.)

3. There are $x + 4$ bakers who *each* bake $x^2 - 9$ cupcakes.

a) How many total cupcakes did they make?

b) There will be a party with all the bakes plus an additional $x^2 - 16$ guests. How many total guests is that?

c) If the cupcakes are supposed to be divided evenly among all of the guests, how many cupcakes (in terms of x) does each person get?

4. Pretend that you are the teacher of a math lesson, and a student writes:

$$\begin{aligned} & \frac{x+4}{x+2} \\ &= \frac{x+4}{x+2} \\ &= \frac{4}{2} \\ &= 2 \end{aligned}$$

Discuss within your group how you should respond. What should you write on this student's paper to do the best job of preventing them from making the same mistake in the future?