

11-1

Practice

Form K

Simplifying Rational Expressions

Simplify each expression. State any excluded values.

1. $\frac{3n - 15}{12} \cdot \frac{n - 5}{4}$

2. $\frac{12t^8}{36t^6} \cdot \frac{t^2}{3}; t \neq 0$

3. $\frac{y + 2}{y^2 - 4} \cdot \frac{1}{y - 2}; y \neq \pm 2$

4. $\frac{15a - 50}{10a + 35} \cdot \frac{3a - 10}{2a + 7}; a \neq -3.5$

5. $\frac{q^2 - 16}{7q^2 + 28q} \cdot \frac{q - 4}{7q}; q \neq 0, -4$

6. $\frac{5x^2 + x - 6}{x^2 - 1} \cdot \frac{5x + 6}{x + 1}; x \neq \pm 1$

7. $\frac{m^3 + 9m}{6m^2 - 3m} \cdot \frac{m^2 + 9}{6m - 3}; m \neq 0, \frac{1}{2}$

8. $\frac{9z^2 - 36}{12z + 24} \cdot \frac{3z - 6}{4}; z \neq -2$

9. The length of a rectangle is $8n + 24$ and the width is $12n + 28$. What is the ratio of its length to its width? Simplify your answer. $\frac{2n + 6}{3n + 7}$
10. The area of a rectangle is $x^2 + 6x - 16$. Its width is $x - 2$. What is a simplified expression for its length? $x + 8$
11. **Writing** Describe how you determine what values should be excluded when simplifying a rational expression. Explain why this must be done.
Set each factor with a variable in the denominator equal to zero and solve for the variable. The denominator cannot equal zero.
12. Are the given factors opposites? Explain.
- $5x - 2; 2 - 5x$
yes, if you factor a negative out of one of the factors, the factors are equivalent.
 - $-t + 10; t + 10$
no, if you factor a negative out of one of the factors, the factors are not equivalent.
 - $102 + 11d; -102 - 11d$
yes, if you factor a negative out of one of the factors, the factors are equivalent.

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Practice (continued)

Form K

Simplifying Rational Expressions

13. A mother is packing away winter clothes into two rectangular tubs. Both hold the same volume of clothes. The first tub has a length of $2b + 5$, a width of $b - 3$, and a height of $4b$. The second tub has a width of $4b^2 + 10b$ and a length of $b - 3$. What is a simplified expression for the height of the second tub? Show your work.

$$(2b + 5)(b - 3)(4b) = h(4b^2 + 10b)(b - 3)$$

$$\frac{(2b + 5)(b - 3)(4b)}{(2b)(2b + 5)(b - 3)} = h$$

$$2 = h$$

Simplify each expression. State any excluded values.

14. $\frac{x^2 - 121}{3x^2 - 9x}$ $\frac{x^2 - 121}{3x^2 - 9x}$; $x \neq 0, 3$

15. $\frac{v^3w^3}{v^2w^3}$ v ; $v \neq 0, w \neq 0$

16. $\frac{5x^2 - 41x + 42}{x^2 - 49}$ $\frac{5x - 6}{x + 7}$; $x \neq \pm 7$

17. $\frac{2t^4 + t^3 - 28t^2}{t^2 + 4t}$ $t(2t - 7)$; $t \neq 0, -4$

18. $\frac{9m^2 - 32m - 65}{m^2 - 25}$ $\frac{9m + 13}{m + 5}$; $m \neq \pm 5$

19. $\frac{8a^2 - 12a - 36}{a^2 - 9}$ $\frac{4(2a + 3)}{a + 3}$; $a \neq \pm 3$

20. **Writing** Is $\frac{x^2 - 81}{x - 9}$ the same as $x + 9$? Explain.

No; $\frac{x^2 - 81}{x - 9} = \frac{(x + 9)(\cancel{x - 9})}{\cancel{x - 9}} = x + 9$, but x cannot equal 9 in the first expression.

21. **Reasoning** Is $y = 4$ an acceptable value for the expression $\frac{3y^2 - 10y - 8}{y^2 - 16}$? Explain.

No; $4^2 - 16 = 0$; This would make the denominator equal to 0.