

6.2 Multiplication and Division of Rational Expressions

Simplifying Rational Expressions
Review of Multiplication and Division of Fractions
Multiplication of Rational Expressions
Division of Rational Expressions

Key Terms

Use the expressions listed below to complete the statements in exercises 1-4. Note that some expressions may not be used.

$$\frac{ac}{bd}$$

$$\frac{ad}{bc}$$

$$\frac{a}{b}$$

$$0$$

$$-1$$

1. The basic principle of fractions states that $\frac{a \cdot c}{b \cdot c} =$ _____.
2. In general, if $a \neq b$, then $\frac{b-a}{a-b} =$ _____.
3. To multiply two rational expressions, use the property $\frac{a}{b} \cdot \frac{c}{d} =$ _____.
4. To divide two rational expressions, use the property $\frac{a}{b} \div \frac{c}{d} =$ _____.

Simplifying Rational Expressions*Exercises 1-7: Simplify each expression.*

1. $\frac{12x}{4x^3}$ 1. _____

2. $\frac{2y-6}{5y-15}$ 2. _____

3. $\frac{3x^2+2x-5}{x^2+5x-6}$ 3. _____

4. $\frac{x^2-y^2}{x-y}$ 4. _____

5. $-\frac{b-1}{1-b}$ 5. _____

6. $\frac{-y+3}{2y-6}$ 6. _____

7. $\frac{4-x}{x-4}$ 7. _____

Review of Multiplication and Division of Fractions*Exercises 8-10: Multiply and simplify the product.*

8. $\frac{4}{5} \cdot \frac{1}{8}$

8. _____

9. $\frac{2}{3} \cdot \frac{9}{4}$

9. _____

10. $\frac{5}{8} \cdot \frac{4}{7} \cdot \frac{2}{5}$

10. _____

Multiplication of Rational Expressions*Exercises 11-13: Multiply.*

11. $\frac{1}{2x} \cdot \frac{x-3}{x}$

11. _____

12. $\frac{x}{x+4} \cdot \frac{3x}{x+4}$

12. _____

13. $\frac{x+2}{x-3} \cdot \frac{x+2}{x-3}$

13. _____

Exercises 14-19: Multiply and simplify.

14. $\frac{3x^2}{5} \cdot \frac{10}{9x}$

14. _____

15. $\frac{x}{2x-4} \cdot \frac{x-2}{3x}$

15. _____

16. $\frac{x^2-25}{x^2-4} \cdot \frac{x+2}{x-5}$

16. _____

17. $\frac{2x^3y}{5xy^2} \cdot \frac{(3x^3y)^2}{2x^2y^4}$

17. _____

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

18. _____

19. $\frac{3s}{t} \cdot \frac{s^2-t^2}{s} \cdot \frac{t}{s-t}$

19. _____

Division of Rational Expressions*Exercises 20-22: Write the reciprocal of each expression.*

20. $2x - 1$

20. _____

21. $\frac{4}{x^2 - 3}$

21. _____

22. $\frac{x + 2}{x - 2}$

22. _____

Exercises 23-29: Divide and simplify.

23. $\frac{3}{x} \div \frac{x + 5}{6x}$

23. _____

24. $\frac{2x}{3x + 6} \div \frac{3x}{x + 2}$

24. _____

25. $\frac{x^2 - 5x + 6}{x^2 - 4} \div \frac{x - 3}{x + 2}$

25. _____

$$26. \frac{9x^4}{14y^2} \div \frac{81x^2}{7y}$$

26. _____

$$27. \frac{3x-3}{x+1} \div (x-1)$$

27. _____

$$28. \frac{x^2-9}{x^2+6x+5} \div \frac{x^2-6x+9}{5x^2+25x}$$

28. _____

$$29. \frac{5a}{b} \div \frac{a}{b^2} \div \frac{2b}{3a}$$

29. _____

30. The area A of a rectangle is $3x^2 + 10x + 8$ and its width W is $x + 2$.

(a) Find the length L of the rectangle.

30. (a) _____

(b) Find the length if the width is 8 inches.

(b) _____