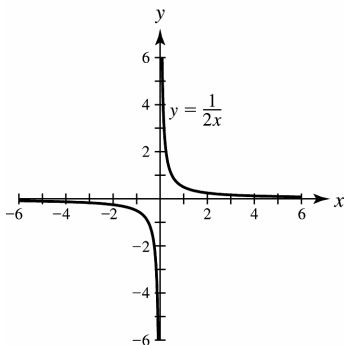

Chapter 6 Rational Expressions and Functions

6.1 Introduction to Rational Functions and Equations

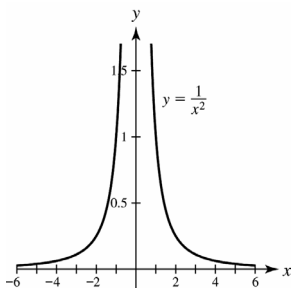
1. rational expression
3. extraneous solution

Recognizing and Using Rational Functions

1. Yes
3. Yes
5. $D = \{x \mid x \neq 3\}$
7. $D = \{t \mid t \neq 1, t \neq 4\}$
9. $D = \{x \mid x \neq 0\}$



11. $D = \{x \mid x \neq 0\}$



13. $-\frac{1}{3}$

15. -4

17. 6.35; The outer rail on a curve with a radius of 400 feet should be elevated 6.35 inches.

Solving Rational Equations

19. 1
21. No solutions

Operations on Functions

23. 3
25. Undefined
27. $5x + 6$
29. $4x^2 + 27x - 7$

6.2 Multiplication and Division of Rational Expressions

1. $\frac{a}{b}$
3. $\frac{ac}{bd}$

Simplifying Rational Expressions

1. $\frac{3}{x^2}$
3. $\frac{3x+5}{x+6}$
5. 1
7. -1

Review of Multiplication and Division of Fractions

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

Multiplication of Rational Expressions

11. $\frac{x-3}{2x^2}$

13. $\frac{(x+2)^2}{(x-3)^2}$

15. $\frac{1}{6}$

17. $\frac{9x^6}{5y^3}$

19. $3(s+t)$

Division of Rational Expressions

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

23. $\frac{18}{x+5}$

25. 1

27. $\frac{3}{x+1}$

29. $\frac{15a}{2}$

6.3 Addition and Subtraction of Rational Expressions

1. numerator; denominator; $\frac{a+b}{c}$

3. least common multiple

Least Common Multiples

1. $14x^3$

3. $(x+2)(x-4)$

Review of Addition and Subtraction of Fractions

5. $\frac{3}{2}$

7. $\frac{19}{35}$

9. $\frac{1}{2}$

11. $\frac{11}{35}$

Addition of Rational Expressions

13. $\frac{5x+3}{x-1}$

15. $\frac{1}{x-1}$

17. $\frac{3x+1}{x^2}$

19. $\frac{x^2+y^2}{(x+y)(x-y)}$

Subtraction of Rational Expressions

21. $\frac{1}{x}$

23. $\frac{2}{x+2}$

25. $\frac{7(a^2 + b^2)}{(a+b)(a-b)}$

27. $\frac{2x-32}{(x+2)^2(x-2)} = \frac{2(x-16)}{(x+2)^2(x-2)}$

29. Approximately 55 ohms

6.4 Rational Equations

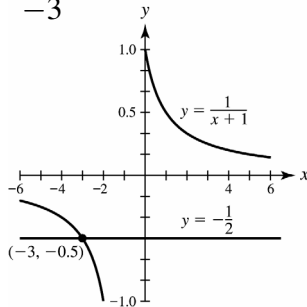
Solving Rational Equations

1. $\frac{2}{9}$

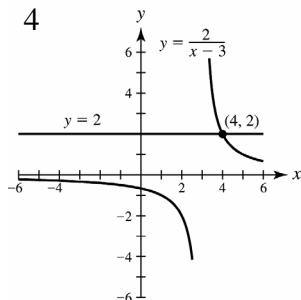
3. 9

5. No solutions

7. -3



9. 4



11. -10

13. No solutions

15. -2

17. -2, 3

19. 17

21. 42 per hour

23. 3 hr, 6 hr

Solving an Equation for a Variable

25. $t = \frac{d}{r}$

27. $r = \frac{C}{2\pi}$

29. $b = a - cr$

6.5 Complex Fractions

Basic Concepts

1. $\frac{2}{3}$

3. $\frac{3b}{2a}$

5. $\frac{14}{9}$

Simplifying Complex Fractions

7. 2

9. $\frac{7}{x}$

11. $3x$

13. $\frac{3x+1}{2x-1}$

15. $-x$

17. $\frac{x^2-1}{x^2+1} = \frac{(x+1)(x-1)}{x^2+1}$

19. $\frac{2}{3}$

6.6 Modeling with Proportions and Variation

1. proportion
3. directly proportional; varies directly
5. varies jointly

Proportions

1. 6

3. 15

5. $\frac{3}{2}$

7. (a) $\frac{4}{7} = \frac{6}{x}$

(b) $x = \frac{21}{2}$

9. (a) $\frac{128}{8} = \frac{x}{11}$

(b) \$176

Direct Variation

11. (a) $k = \frac{3}{2}$

(b) $y = 12$

13. (a) $k = -3$

(b) $y = -24$

Inverse Variation

15. (a) $k = 6$

(b) $y = \frac{3}{4}$

Joint Variation

17. (a) $k = \frac{2}{5}$

(b) $z = \frac{24}{5}$

19. (a) $k = 6$

(b) $z = 72$

Mixed Exercises

21. (a) Neither
(b) N/A

23. Neither

25. Inverse; $k = 12$

27. 16 feet

29. \$1652

6.7 Division of Polynomials**Division by a Monomial**

1. $x^2 - 3x$

3. $x^2 - 4 + \frac{10}{x}$

Division by a Polynomial

5. $4x + 7$

7. $2x - 2 + \frac{13}{4x + 3}$

9. $3x^2 - x + 1 - \frac{2}{x + 3}$

11. $5x^2 - 2x + 3$

13. $3x - 4 + \frac{x + 4}{x^2 + 2}$

15. $x - 2$

17. $4x^2 + 4x + 4 - \frac{1}{x - 1}$

19. $x^2 + 5$

Synthetic Division

21. $x - 2$

23. $x^3 + 2x + 3 + \frac{11}{x - 5}$

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

27. $x^2 + 2x + 4$

29. $2x^4 - 2x^3 + 5x^2 - 5x + 5 - \frac{4}{x + 1}$

