

7.2 Extra Practice

In Exercises 1–3, graph the function. Compare the graph with the graph of

$$f(x) = \frac{1}{x}.$$

1. $h(x) = \frac{12}{x}$

2. $g(x) = \frac{-8}{x}$

3. $h(x) = \frac{0.2}{x}$

In Exercises 4–15, graph the function. Find the domain and range.

4. $f(x) = \frac{5}{x} - 2$

5. $g(x) = \frac{3}{x+4}$

6. $y = \frac{-8}{x-3}$

7. $h(x) = \frac{-1}{x+5}$

8. $y = \frac{-2}{x+1} + 3$

9. $y = \frac{9}{x-4} - 2$

10. $f(x) = \frac{x+5}{x-4}$

11. $g(x) = \frac{x-3}{2x+8}$

12. $h(x) = \frac{-8x+3}{5x+2}$

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

14. $y = \frac{-3x}{-4x-1}$

15. $y = \frac{-2x+5}{-x+8}$

In Exercises 16–21, rewrite the function in the form $g(x) = \frac{a}{x-h} + k$. Graph the

function. Describe the graph of g as a transformation of the graph of $f(x) = \frac{a}{x}$.

16. $g(x) = \frac{3x+7}{x+2}$

17. $g(x) = \frac{4x-2}{x-3}$

18. $g(x) = \frac{4x-10}{x+5}$

19. $g(x) = \frac{x+12}{x-3}$

20. $g(x) = \frac{5x-30}{x+4}$

21. $g(x) = \frac{7x-2}{x+6}$

7.3

Extra Practice

In Exercises 1–6, simplify the expression, if possible.

1. $\frac{4x^3}{3x^3 + 7x}$

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

3. $\frac{2x^2 - 5x}{x^2 + 7x + 12}$

4. $\frac{x^2 - x - 20}{x^3 + 64}$

5. $\frac{x^4 - 16}{5x^3 - 3x^2 + 20x - 12}$

6. $\frac{6x^3 - 6x^2 + 5x - 5}{72x^4 - 50}$

In Exercises 7–12, find the product.

7. $\frac{x^4(x-4)}{x+3} \cdot \frac{(x+3)(x-2)}{x^5}$

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

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

10. $\frac{x^2 - x - 6}{x^2 + 8x + 16} \cdot \frac{3x^2 + 12x}{x^2 - 2x - 3}$

11. $\frac{x^2 + 3x - 28}{x^2 - 25} \cdot (x^2 - 8x + 15)$

12. $\frac{x^2 + 2x - 15}{x^2 - 9} \cdot (x^2 - x - 12)$

In Exercises 13–16, find the quotient.

13. $\frac{2x^3 + 10x^2}{x^2 + x - 20} \div \frac{2x^2}{x-4}$

14. $\frac{x^2 - 10x + 21}{x+2} \div (x^2 - 14x + 49)$

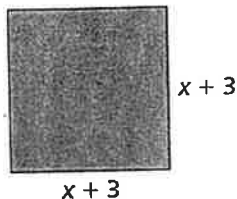
15. $\frac{x^2 - 2x - 3}{x^2 + 2x - 8} \div \frac{x^2 + 4x + 3}{x^2 + 6x + 8}$

16. $\frac{x^2 + x - 6}{x^2 + 7x + 12} \div \frac{x^2 - 5x + 6}{x^2 + x - 12}$

17. Find the expression that makes the following statement true. Assume $x \neq -3$ and $x \neq 2$.

$$\frac{x+3}{x^2-8x+12} \div \frac{\boxed{}}{x^2+3x-10} = \frac{x+5}{x-6}$$

18. Find the ratio of the perimeter to the area of the square shown.



7.4 Extra Practice

In Exercises 1–3, find the sum or difference.

1. $\frac{x}{25x^2} - \frac{5}{25x^2}$

2. $\frac{2x^2}{x+6} + \frac{8x}{x+6}$

3. $\frac{3x}{x-4} - \frac{12}{x-4}$

In Exercises 4–7, find the least common multiple of the expressions.

4. $36x^2, 9x^2 - 18x$

5. $x^2 - 100, x - 10$

6. $25x^2 - 4, 3x^2 - 10x - 8$

7. $x^2 + 7x - 18, x + 9$

In Exercises 8–11, find the sum or difference.

8. $\frac{7}{x-5} + \frac{4x}{x+1}$

9. $\frac{7}{x^2 - 5x - 24} + \frac{3}{x-8}$

10. $\frac{x^2 - 3}{x^2 - 6x - 16} - \frac{x + 5}{x + 2}$

11. $\frac{x-2}{x-3} + \frac{3}{x} + \frac{6x}{2x+1}$

12. Describe and correct the error in finding the sum.

$$\times \quad \frac{4}{7x} + \frac{5}{x^3} = \frac{4(x^3)}{7x(x^3)} + \frac{5(7x)}{x^3(7x)} = \frac{4x^3 + 35x}{7x^4}$$

In Exercises 13 and 14, tell whether the statement is *always*, *sometimes*, or *never* true. Explain.

13. The LCD of two rational functions is one of the denominators when the other denominator is a factor.
14. The LCD of two rational functions will have a degree equal to that of the denominator with the higher degree.

In Exercises 15–18, rewrite the function g in the form $g(x) = \frac{a}{x-h} + k$.

Graph the function. Describe the graph of g as a transformation of the graph of $f(x) = \frac{a}{x}$.

15. $g(x) = \frac{5x+3}{x+4}$

16. $g(x) = \frac{9x}{x+12}$

17. $g(x) = \frac{5x-4}{x}$

18. $g(x) = \frac{8x+13}{x-6}$

7.5 Extra Practice

In Exercises 1–3, solve the equation by cross multiplying. Check your solution(s).

1. $\frac{3}{x+2} = \frac{5}{x-2}$

2. $\frac{2}{x-4} = \frac{x-3}{x-1}$

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

4. So far in soccer practice, you have made 10 out of 32 goal attempts. Solve the equation $0.45 = \frac{10+x}{32+x}$ to find the number x of consecutive goals you need to make to raise your goal average to 0.45.

In Exercises 5 and 6, identify the LCD of the rational expressions in the equation.

5. $\frac{6}{x+3} + \frac{x}{x+2} = \frac{4}{5}$

6. $\frac{6}{x-8} - \frac{2x}{3x-2} = \frac{9}{4}$

In Exercises 7–12, solve the equation by using the LCD. Check your solution(s).

7. $\frac{3}{4x} + \frac{1}{8} = \frac{7}{4x}$

8. $\frac{5}{x-6} + \frac{1}{x} = \frac{x-1}{x-6}$

9. $\frac{x-4}{x-5} + 5 = \frac{4x}{x}$

10. $\frac{16}{x^2-4x} - \frac{8}{x-4} = \frac{4}{x}$

11. $\frac{x+1}{x+2} + \frac{1}{x} = \frac{2x+1}{x+2}$

12. $\frac{4}{x} - 1 = \frac{4}{x+2}$

13. Describe and correct the error in the first step of solving the equation.

\times $\frac{3}{x+2} + 5 = \frac{1}{x}$

$(x+2) \cdot \frac{3}{x+2} + (x+2) \cdot 5 = (x+2) \cdot \frac{1}{x}$