Example 4 (p. 460)

ELECTRICITY For Exercises 9–12, use the following information.
The current I in amperes in an electrical circuit with three resistors in series is given by the equation $I = \frac{V}{R_1 + R_2 + R_3}$, where V is the voltage in volts in the circuit and R_1, R_2, and R_3 are the resistances in ohms of the three resistors.

See margin.

9. Let R_1 be the independent variable, and let I be the dependent variable. Graph the function if $V = 120$ volts, $R_2 = 25$ ohms, and $R_3 = 75$ ohms.
10. Give the equation of the vertical asymptote and the R_1- and I-intercepts of the graph. $R_1 = -100$; no R_1-intercept; 1.2
11. Find the value of I when the value of R_1 is 140 ohms. 0.5 amperes
12. What domain and range values are meaningful in the context of the problem? $R_1 \geq 0$ and $0 < I \leq 1.2$

A# 8.3 14-28 even

Exercises

HOMEWORK HELP

For Exercises	See Examples
13–16	1
17–26	2
27, 28	3
29–36	4

Exercise Levels
13–36
37–49
50–54

Determine the equations of any vertical asymptotes and the values of x for any holes in the graph of each rational function.

13. $f(x) = \frac{2}{x^2 - 5x + 6}$ See margin.
14. $f(x) = \frac{4}{x^2 + 2x - 8}$ asymptotes: $x = -4$, $x = 2$
15. $f(x) = \frac{x + 3}{x^2 + 7x + 12}$ See margin.
16. $f(x) = \frac{x - 5}{x^2 - 4x - 5}$ asymptote: $x = -1$; hole: $x = 5$

Graph each rational function. 17–20. See margin.

17. $f(x) = \frac{1}{x}$
18. $f(x) = \frac{3}{x}$
19. $f(x) = \frac{1}{x + 2}$
20. $f(x) = \frac{-5}{x + 1}$
21. $f(x) = \frac{x}{x - 3}$
22. $f(x) = \frac{5x}{x + 1}$
23. $f(x) = \frac{-3}{(x - 2)^2}$
24. $f(x) = \frac{1}{(x + 3)^2}$
25. $f(x) = \frac{x + 4}{x - 1}$
26. $f(x) = \frac{x - 1}{x - 3}$
27. $f(x) = \frac{x^2 - 36}{x + 6}$
28. $f(x) = \frac{x^2 - 1}{x - 1}$

21–28. See Ch. 8 Answer Appendix.

PHYSICS For Exercises 29–32, use the following information.
Under certain conditions, when two objects collide, the objects are repelled from each other with velocity given by the equation $V_f = \frac{2m_1v_1 + v_2(m_2 - m_1)}{m_1 + m_2}$.
In this equation m_1 and m_2 are the masses of the two objects, v_1 and v_2 are the initial speeds of the two objects, and V_f is the final speed of the second object.

29. Let m_2 be the independent variable, and let V_f be the dependent variable. Graph the function if $m_1 = 5$ kilograms and $v_1 = 15$ meters per second, and $v_2 = 20$ meters per second. See Ch. 8 Answer Appendix.
30. Use the equation and the values in Exercise 29 to determine the final speed if $m_2 = 20$ kilograms. 18 m/s
31. Give the equation of any asymptotes and the m_2- and V_f-intercepts of the graph. $m_2 = -5$, $V_f = 20$; -2.5; 10
32. What domain and range values are meaningful in the context of the problem? $m_2 > 0$ and $10 < V_f < 20$

DIFFERENTIATED HOMEWORK OPTIONS

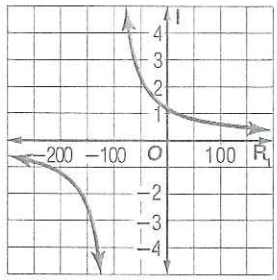
Level	Assignment	Two-Day Option	
BL Basic	13–36, 50, 51, 54–70	13–35 odd, 55, 56	14–36 even, 50, 51, 54, 57–70
OL Core	13–27 odd, 29–32, 37–45 odd, 47–51, 54–70	13–36, 55, 56	37–51, 54, 57–70
AL Advanced /Pre-AP	37–66 (optional: 67–70)		

Odd/Even Assignments

Exercises 13–36 are structured so that students practice the same concepts whether they are assigned odd or even problems.

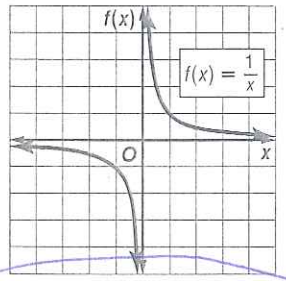
Additional Answers

9.



13. asymptotes: $x = 2$, $x = 3$
15. asymptotes: $x = -4$; hole: $x = -3$

17.



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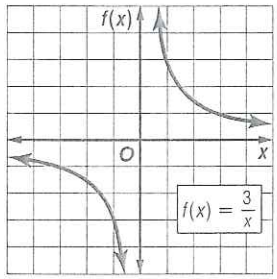

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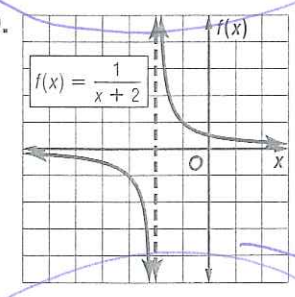

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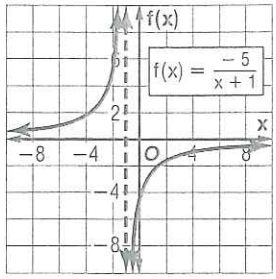

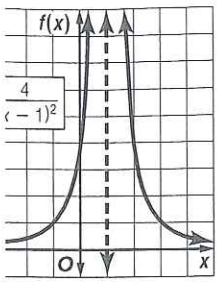

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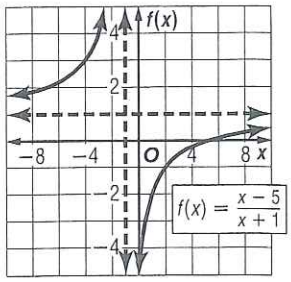

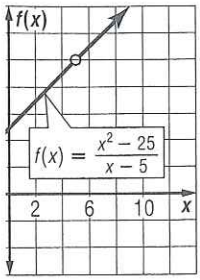

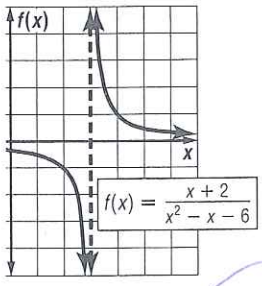

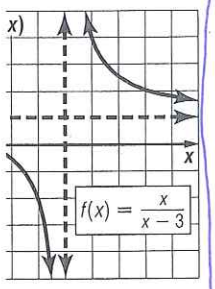

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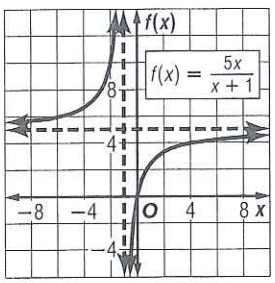

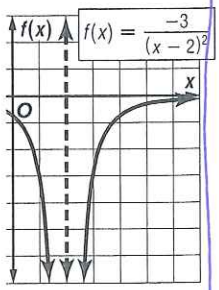

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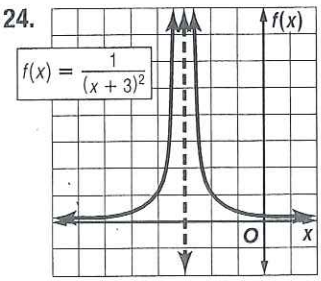

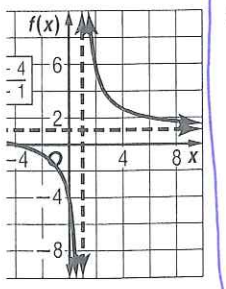

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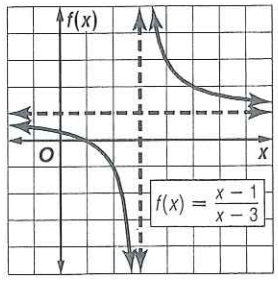

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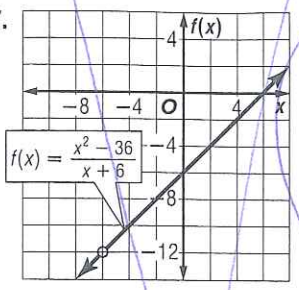

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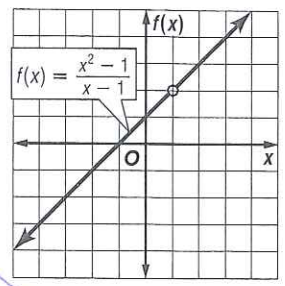

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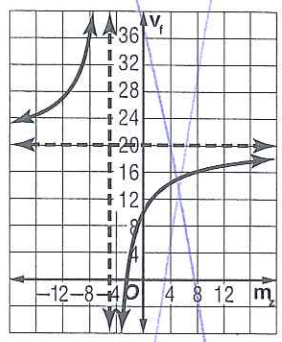

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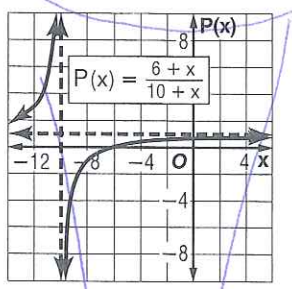

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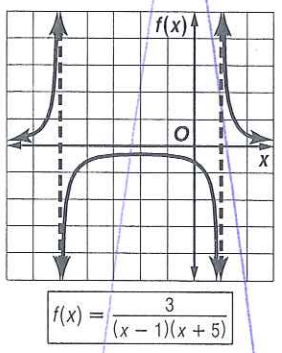

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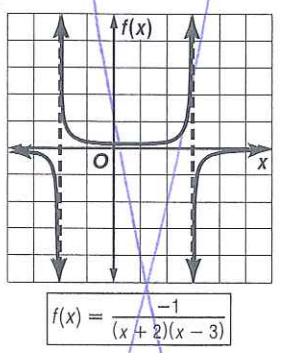

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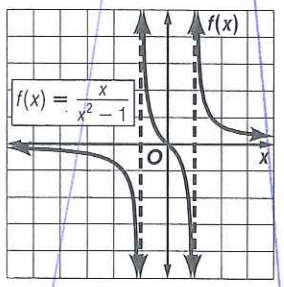

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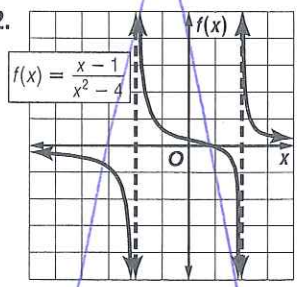

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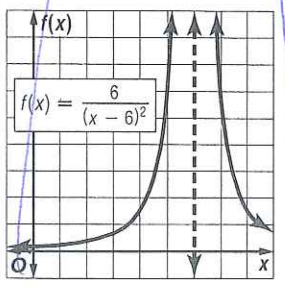

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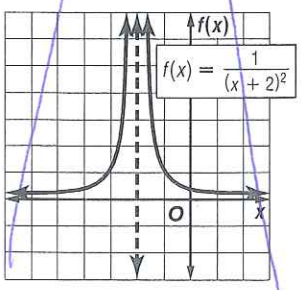

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