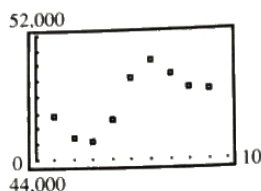
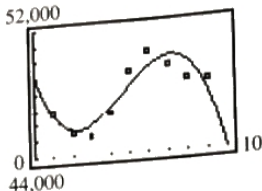


98. (a) Cubic, $a < 0$



(b) $S(x) = -74.4520x^3 + 1048.7554x^2 - 3565.7688x + 49,124.0714$ 99. No; yes
(c) 52,000 (d) About 43,890,000 sales



104. a, b, c, d

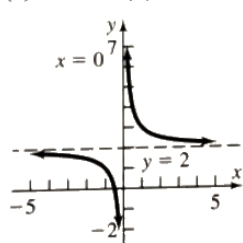
4.3 Concepts and Vocabulary (page 339)

5. $y = 1$ 6. $x = -1$ 7. proper 8. False 9. True 10. True

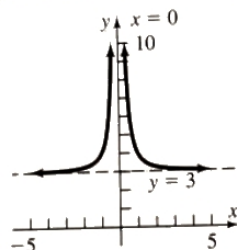
4.3 Exercises (page 339)

11. All real numbers except 3; $\{x|x \neq 3\}$ 12. All real numbers except -3 ; $\{x|x \neq -3\}$
13. All real numbers except 2 and -4 ; $\{x|x \neq 2, x \neq -4\}$ 14. All real numbers except -3 and 4; $\{x|x \neq -3, x \neq 4\}$
15. All real numbers except $-\frac{1}{2}$ and 3; $\{x|x \neq -\frac{1}{2}, x \neq 3\}$ 16. All real numbers except $\frac{1}{3}$ and -2 ; $\{x|x \neq \frac{1}{3}, x \neq -2\}$
17. All real numbers except 2; $\{x|x \neq 2\}$ 18. All real numbers except -1 and 1; $\{x|x \neq -1, x \neq 1\}$ 19. All real numbers
20. All real numbers 21. All real numbers except -3 and 3; $\{x|x \neq -3, x \neq 3\}$ 22. All real numbers except -2 ; $\{x|x \neq -2\}$
23. (a) Domain: $\{x|x \neq 2\}$; Range: $\{y|y \neq 1\}$ (b) $(0, 0)$ (c) $y = 1$ (d) $x = 2$ (e) None
24. (a) Domain: $\{x|x \neq -1\}$; Range: $\{y|y > 0\}$ (b) $(0, 2)$ (c) $y = 0$ (d) $x = -1$ (e) None
25. (a) Domain: $\{x|x \neq 0\}$; Range: all real numbers (b) $(-1, 0), (1, 0)$ (c) None (d) $x = 0$ (e) $y = -x$
26. (a) Domain: $\{x|x \neq 0\}$; Range: $\{y|y \leq -2, y \geq 2\}$ (b) None (c) None (d) $x = -2, x = 2$ (e) None
27. (a) Domain: $\{x|x \neq -2, x \neq 2\}$; Range: $\{y|y \leq 0, y > 1\}$ (b) $(0, 0)$ (c) $y = 1$ (d) $x = -2, x = 2$ (e) None
28. (a) Domain: $\{x|x \neq -1, x \neq 1\}$; Range: All real numbers (b) $(0, 0)$ (c) $y = 0$ (d) $x = -1, x = 1$ (e) None

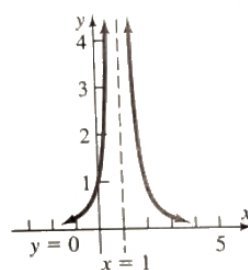
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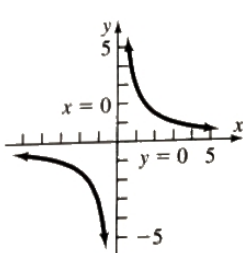
30.



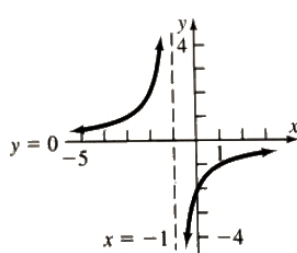
31.



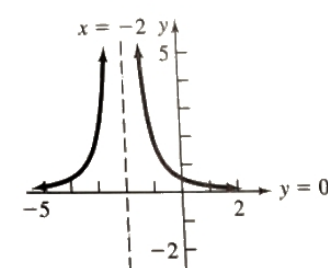
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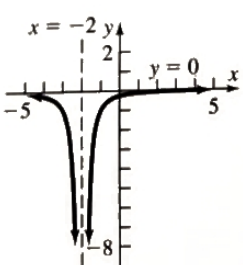
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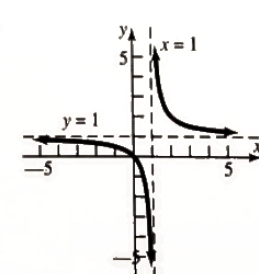
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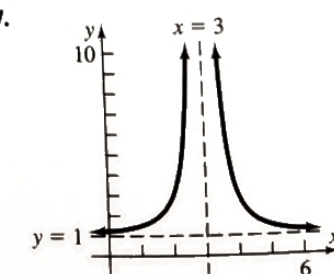
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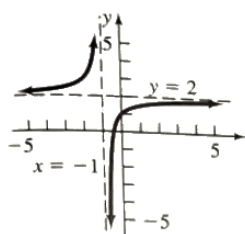
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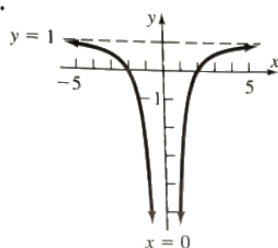
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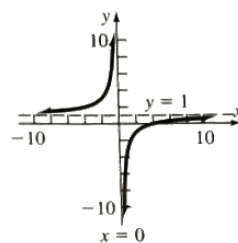
38.



39.



40.



41. Horizontal asymptote: $y = 3$; vertical asymptote: $x = -4$ 42. Horizontal asymptote: $y = 3$; vertical asymptote: $x = 6$
 43. No asymptotes 44. Vertical asymptote: $x = -5$; oblique asymptote: $y = -x + 5$
 45. Horizontal asymptote: $y = 0$; vertical asymptotes: $x = 1, x = -1$ 46. Vertical asymptote: $x = 1$
 47. Horizontal asymptote: $y = 0$; vertical asymptote: $x = 0$ 48. Horizontal asymptote: $y = 0$; vertical asymptotes: $x = 0, x = -2$
 49. Oblique asymptote: $y = 3x$; vertical asymptote: $x = 0$ 50. Horizontal asymptote: $y = 2$; vertical asymptotes: $x = -\frac{1}{3}, x = 2$
 51. Oblique asymptote: $y = -(x + 1)$; vertical asymptote: $x = 0$ 52. Horizontal asymptote: $y = 0$; vertical asymptotes: $x = -1, x = 0$
 53. (a) 9.8209 m/sec^2 (b) 9.8195 m/sec^2 54. (a) 25 (b) Approximately 596
 (c) 9.7936 m/sec^2 (d) h -axis (c) 2500