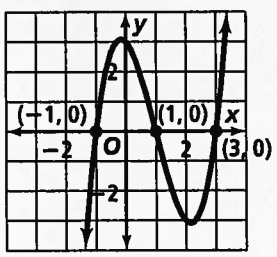
Chapter 6 Answers

Practice 6-1

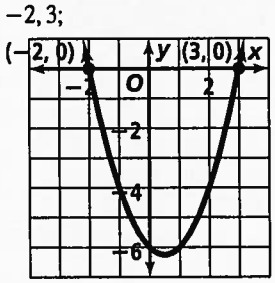
1. $y = -0.0439814815x^3 + 0.6507936508x^2 - 2.935185185x + 24.84126984$; 21.098 **2.** $y = 0.0130787037x^3 - 0.1743055556x^2 + 0.7951058201x + 3.125396825$; 4.6362 **3.** $5x + 2$; linear binomial **4.** -3; constant monomial **5.** $6x^4 - 1$; quartic binomial **6.** $5s^4 - 2s + 1$; quartic trinomial **7.** $2m^2$; quadratic monomial **8.** $-4x^3 + x^2 + 3x$; cubic trinomial **9.** $2x^2 - 1$; quadratic binomial **10.** $-3m^3 + 5m^2$; cubic binomial **11.** $-7x^2 + 5x$; quadratic binomial **12.** $3x^3$; cubic monomial **13.** $-x^3 + 2$; cubic binomial **14.** $-x$; linear monomial **15.** $a^5 + a^4 + a^3$; quintic trinomial **16.** $x^2 - 25$; quadratic binomial **17.** $p^2 - 5p + 6$; quadratic trinomial **18.** $9c^4$; quartic monomial **19.** $b - 3$; linear binomial **20.** $12x - 6$; linear binomial **21.** $s^2 + \frac{2}{3}$; quadratic binomial **22.** $\frac{1}{2}x^4 + x - \frac{5}{4}$; quartic trinomial **23.** $-\frac{1}{3}z^5 + 1$; quintic binomial **24.** $3x + 5$ units **25.** $0.0008797x^3 + 0.2229900x^2 - 3.1465532x + 29.0544437$; about \$1203.18 **26.** $0.0000006x^3 - 0.0005101x^2 + 0.1270416x + 2.0612682$; about 12 yr

Practice 6-2

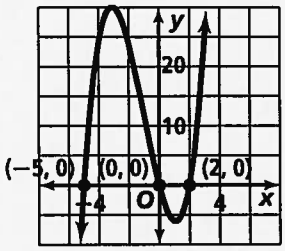
1. 5, multiplicity 3 **2.** 0; 8, multiplicity 2 **3.** 2; -7, multiplicity 3 **4.** 0, multiplicity 2; 4, multiplicity 2 **5.** $-3, 0, 3$ **6.** $-\frac{5}{2}$; 3, multiplicity 2 **7.** $y = 2x^3 - x^2 - 50x + 25$ **8.** $y = -2x^3 + 15x^2 - 22x - 15$ **9.** $V = x^3 + 54x^2 + 936x + 5184$ **10.** $y = x^3 - 6x^2 + 5x + 12$ **11.** $y = x^3 - 4x^2 + 5x - 2$ **12.** $y = x^4 - 2x^3 - 15x^2$ **13.** $y = x^3 + 6x^2 + 12x + 8$ **14.** $x^3 - 2x^2 + x$ **15.** $x^3 + 7x^2 + 15x + 9$ **16.** $2x^4 + 23x^3 + 60x^2 - 125x - 500$ **17.** $y = 2x(x + 2)(x + 3)$ **18.** $y = x^2(x + 2)(x - 3)$ **19.** $y = -3x(x - 3)^2$ **20.** $-1, 1, 3$;



21. $-2, 3$;



22. $-5, 0, 2$;



23. rel. max.: 4.06; rel. min.: -8.21; zeros: 0, 2, 5 **24.** rel. max.: 16.9; rel. min.: -5.05; zeros: $-3, 1, 3$ **25.** $x(x + 2)(x - 8)$ **26.** $x(x + 3)(x + 4)$ **27.** $x(x - 3)(x - 5)$ **28a.** $V = x^2(20 - x)$ **28b.** about 1185 in.^{3}

Practice 6-3

1. yes **2.** yes **3.** no **4.** yes **5.** $x^2 - 3x + 2$ **6.** $x^2 + 3x - 7$, R 5 **7.** $-2x^2 + 9x + 5$ **8.** $x^2 + 6x + 9$ **9.** $x^2 - x + 8$, R -12 **10.** $x^2 - 7$, R -10 **11.** $x^3 + x$, R 1 **12.** $x^3 + 2x^2 + 6$ **13.** $x^3 - x^2 + x + 11$, R 32 **14.** $2x^3 + 15x^2 - 125$ **15.** -1 **16.** -13 **17.** 0 **18.** 39 **19.** $x - 16$ **20.** $2x + 11$, R 48 **21.** $x^2 + 6x + 3$, R 2 **22.** $3x^2 - 7x + 7$, R -8 **23.** $(x + 1)(x - 3)(x + 5)$ **24.** $(x - 2)(x + 3)(x - 4)$ **25.** $2x^2 - 2x - 1$, R 16 **26.** $x^3 + 3x^2 + 3x + 4$, R 1 **27.** $x^3 + 2x^2 - x$, R 1 **28.** $x^4 + x^3 + x^2 + x + 1$ **29.** $x^3 + 2x^2 + x + 2$, R -6 **30.** $3x^2 - 3x + 3$ **31.** width: $x - 3$; height: $x - 5$

Practice 6-4

1. $(2x - 3)(4x^2 + 6x + 9)$; $\frac{3}{2}, \frac{-3 \pm 3i\sqrt{3}}{4}$

2. $(x + 4)(x^2 - 4x + 16)$; $-4, 2 \pm 2i\sqrt{3}$

3. $2(x + 3)(x^2 - 3x + 9)$; $-3, \frac{3 \pm 3i\sqrt{3}}{2}$

4. $2(x - 5)(x^2 + 5x + 25)$; $5, \frac{-5 \pm 5i\sqrt{3}}{2}$

5. $4(x - 2)(x^2 + 2x + 4)$; $2, -1 \pm i\sqrt{3}$

6. $(3x + 1)(9x^2 - 3x + 1)$; $-\frac{1}{3}, \frac{1 \pm i\sqrt{3}}{6}$

7. $(4x - 1)(16x^2 + 4x + 1)$; $\frac{1}{4}, \frac{-1 \pm i\sqrt{3}}{8}$

8. $(x - 3)(x^2 + 3x + 9)$; $3, \frac{-3 \pm 3i\sqrt{3}}{2}$

9. $(x + 1)(x - 1)(x + 2)(x - 2)$; $-2, -1, 1, 2$

10. $(x + 1)(x - 1)(x^2 - 11)$; $-1, 1, -\sqrt{11}, \sqrt{11}$

11. $(x^2 - 2)(x^2 - 8)$; $-\sqrt{2}, \sqrt{2}, -\sqrt{8}, \sqrt{8}$

12. $(x + 2)^2(x - 2)^2$; $-2, 2$

13. $(x^2 - 7)(x^2 - 2)$; $-\sqrt{7}, \sqrt{7}, -\sqrt{2}, \sqrt{2}$

14. $(x^2 + 4)(x^2 + 9)$; $-2i, 2i, -3i, 3i$

15. $(x + 1)(x - 1)(x + 3)(x - 3)$; $-1, 1, -3, 3$

16. $(x + 1)(x - 1)(x^2 + 4)$; $-1, 1, -2i, 2i$

17. 5.52% **18.** $-2, 2, -0.71, 0.71$ **19.** 0.06, 15.94 **20.** 0