

Chapter 11 Answers

Practice 11-1

- $a_n = a_{n-1} + 6$ where $a_1 = -14$; 16
- $a_n = a_{n-1} - 0.3$ where $a_1 = 6$; 4.5
- $a_n = -2a_{n-1}$ where $a_1 = 1$; -32
- $a_n = 3a_{n-1}$ where $a_1 = 1$; 81
- $a_n = \frac{1}{2}a_{n-1}$ where $a_1 = 1$; $\frac{1}{32}$
- $a_n = a_{n-1} + \frac{1}{3}$ where $a_1 = \frac{2}{3}$; $2\frac{1}{3}$
- $a_n = a_{n-1} + 3$ where $a_1 = 36$; 51
- $a_n = a_{n-1} - 6$ where $a_1 = 36$; 6
- $a_n = \frac{1}{2}a_{n-1}$ where $a_1 = 9.6$; 0.3
- $a_n = 7n$; 140
- $a_n = 6n - 4$; 116
- $a_n = n + 4$; 24
- $a_n = n - 2$; 18
- $a_n = 2n + 1$; 41
- $a_n = 0.8n$; 16
- $a_n = \frac{n}{4}$; 5
- $a_n = \frac{1}{2n}$; $\frac{1}{40}$
- $a_n = n - \frac{1}{3}$; $19\frac{2}{3}$
- multiply by 2; 32, 64, 128
- subtract 5; 19, 14, 9
- add 0.1; 1.2, 1.3, 1.4
- add 7; 39, 46, 53
- multiply by 2; 40, 80, 160
- subtract 3; -21, -24, -27
- explicit; $\frac{1}{3}$, $\frac{2}{3}$, 1, $\frac{4}{3}$, $\frac{5}{3}$
- explicit; -5, -2, 3, 10, 19
- recursive; 5, 8, 17, 44, 125
- explicit; 0, $\frac{1}{2}$, 1, $1\frac{1}{2}$, 2
- recursive; 5, -2, 5, -2, 5
- recursive; -4, -8, -16, -32, -64
- $a_1 = 1, 6, 36, 216$
- $a_n = 6a_{n-1}$ where $a_1 = 1$
- 60°
- $a_n = \frac{360}{n}$
- No polygon has one or two angles.

Practice 11-2

- 96
- 406.9
- 36.3
- 99
- 464
- 231
- 5.5
- 10.5
- 171
- no
- yes; -3
- yes; -0.4
- yes; 5
- yes; -29
- yes; 0.3
- yes; 6
- yes; 0.2
- yes; 13
- 36
- 21
- 31
- 14.5
- 42
- 3.5
- 0
- 2
- 21.5
- 28.5
- 227
- 189.5
- 4.5
- 14.5
- 33.9
- $\frac{3}{5}$
- 1
- 6.5
- $a_n = a_{n-1} + 5$ where $a_1 = 32$
- 32, 37, 42, 47, 52
- $a_n = 32 + 5(n - 1)$
- 127 people

Practice 11-3

- 8
- 12
- 4
- 6
- 10
- 4.8
- yes; 3; 243, 729
- yes; 2; 64, 128
- no
- yes; -2; 64, -128
- yes; 0.5; 0.0625, 0.03125
- yes; 0.3; 0.81, 0.243
- no
- yes; -0.5; 4, -2
- no
- geometric; $\frac{1}{9}$, $\frac{1}{27}$
- neither; -9, -14
- geometric; 2, -2
- arithmetic; 17, 22
- arithmetic; -11, -14
- neither; 5, -6
- $a_n = 3(-2)^{n-1}$; 3, -6, 12, -24, 48
- $a_n = 5(3)^{n-1}$; 5, 15, 45, 135, 405
- $a_n = -1(4)^{n-1}$; -1, -4, -16, -64, -256
- $a_n = -2(-3)^{n-1}$; -2, 6, -18, 54, -162

- $a_n = 32(-0.5)^{n-1}$; 32, -16, 8, -4, 2
- $a_n = 2187\left(\frac{1}{3}\right)^{n-1}$; 2187, 729, 243, 81, 27
- $a_n = 9(2)^{n-1}$; 9, 18, 36, 72, 144
- $a_n = -4(4)^{n-1}$; -4, -16, -64, -256, -1024
- $a_n = 0.1(-2)^{n-1}$; 0.1, -0.2, 0.4, -0.8, 1.6
- about 19.2 in.
- 9 mm
- $a_n = 2537(1.025)^{n-1}$
- about 2732
- $a_n = 1(1.5)^{n-1}$
- 1.5 in.
- 2.25 in.
- about 86.5 in.

Practice 11-4

- 4; 0; 3; 6
- 5; 3; 11; 35
- 6; 28; 33; 183
- 4; 13; 28; 82
- 4; 2.5; 8.5; 22
- 6; 2; -3; -3
- 6; 5; 10; 45
- 4; -4; -7; -22
- 4; 11; 20; 62
- $1 + 3 + 5 + 7 + 9 + 11 + 13 + 15$; 64
- $5 + 8 + 11 + 14 + 17 + 20 + 23 + 26$; 124
- $4 + 9 + 14 + 19 + 24 + 29 + 34 + 39 + 44$; 216
- $10 + 25 + 40 + 55 + 70 + 85$; 285
- $17 + 25 + 33 + 41 + 49 + 57 + 65$; 287
- $125 + 126 + 127 + 128 + 129 + 130 + 131$; 896
- $\sum_{n=1}^7 (2n - 1)$
- $\sum_{n=1}^5 (0.3n + 2)$
- $\sum_{n=1}^4 4n$
- $\sum_{n=1}^6 (-3n + 13)$
- $\sum_{n=1}^8 (4n - 1)$
- $\sum_{n=1}^7 (10n + 5)$
- sequence; finite
- series; infinite
- sequence; infinite
- series; finite
- 9
- 39
- 72
- 51
- 4.5
- 60
- 1025 stitches
- 19 musicians; 84 musicians

Practice 11-5

- converges; yes
- converges; yes
- converges; yes
- diverges; no
- converges; yes
- diverges; no
- 15
- no sum
- $\frac{2}{3}$
- no sum
- 16
- 1.5
- 600
- 4000
- arithmetic; 126
- geometric; $\frac{255}{1024}$
- geometric; 1023
- arithmetic; 240
- 79.921875
- 28,697,812
- about 74.99
- 40.5
- 0.22222222
- 6300
- \$8553.71
- \$40,928.80
- 5000 cm
- about 177.78 mm
- \$2,319,367.05; \$4,950,000

Practice 11-6

- For Exercises 1-19, answers are in units².
- $0.5(3.75) + 0.5(3) + 0.5(1.75) + 0.5(0)$; 4.25
 - $0.5(4) + 0.5(3.75) + 0.5(3) + 0.5(1.75)$; 6.25
 - $0.5(15.5) + 0.5(14) + 0.5(11.5) + 0.5(8)$; 24.5
 - $0.5(16) + 0.5(15.5) + 0.5(14) + 0.5(11.5)$; 28.5
 - $0.5(1.875) + 0.5(1.5) + 0.5(0.875) + 0.5(0)$; 2.125
 - $0.5(2) + 0.5(1.875) + 0.5(1.5) + 0.5(0.875)$; 3.125
 - $0.5(4) + 0.5(4.25) + 0.5(5) + 0.5(6.25)$; 9.75
 - $0.5(4.25) + 0.5(5) + 0.5(6.25) + 0.5(8)$; 11.75

Chapter 6 Answers (continued)

+ 1458x² + 729 34. x⁷ - 35x⁶ + 525x⁵ - 4375x⁴
 + 21875x³ - 65625x² + 109375x - 78125
 35. x⁴ - 16x³y + 96x²y² - 256xy³ + 256y⁴

Reteaching 6-1

Let x = the years since 1980 and y = the points earned.

Linear: $y = -8.533x + 831.48667$

Quadratic: $y = 1.09767x^2 - 30.48635x + 890.02893$

Cubic: $y = -0.05697x^3 + 2.80674x^2 - 42.97396x + 900.96698$

The cubic model gives the best fit. In 2004, the estimated diving record is 698.72 points.

Reteaching 6-2

- $f(x) = x^3 - 7x^2 + 7x + 15$
- $f(x) = x^3 - 3x^2 - 33x + 35$
- $f(x) = x^3 + 6x^2 - x - 6$ 4. $f(x) = x^3 + 3x^2 - 4x - 12$
- $f(x) = x^3 - 6x^2 + 11x - 6$
- $f(x) = x^4 - x^3 - 11x^2 + 9x + 18$
- $f(x) = x^3 + 6x^2 - 16x$ 8. $f(x) = x^3 + 8x^2 - 20x$
- $f(x) = x^3 + 6x^2 - x - 6$
- $f(x) = x^3 + 3x^2 - 4x - 12$
- $f(x) = x^3 + \frac{3}{2}x^2 - 4x - 6$ 12. $f(x) = x^2 + \frac{1}{3}x - \frac{2}{3}$
- $f(x) = x^3 + \frac{10}{3}x^2 - \frac{1}{3}x - 4$
- $f(x) = x^3 + 7x^2 + 16x + 12$
- $f(x) = x^3 - 12x - 16$ 16. $f(x) = x^3 - 3x - 2$
- 0, -8, 2 18. 2, -2, 3, -3 19. 3, -3 20. $-\frac{2}{3}, 5$ 21. 0, 8
- 4, 4, -1, 1 23. 0, -2, 10 24. 2, -2, -3 25. $-\frac{1}{2}, 5, -3$
- 0, -4, $\frac{3}{2}$ 27. 0, $\sqrt{5}, -\sqrt{5}$ 28. 0, 6, -6

Reteaching 6-3

- $3x - 5, R 2$ 2. $x^2 - x + 3, R -22$ 3. $x + 8, R 32$
- $x + 3, R 5$ 5. $x^2 - 4x - 1$ 6. $2x^2 + x + 1$
- $2x + 2, R 13$ 8. $x^2 - 5x + 15, R -101$
- $x - 4, R -2$ 10. $2x^2 - 3x + 10, R -24$

Reteaching 6-4

- $2, -1 \pm i\sqrt{3}$ 2. $-1, \frac{1 \pm i\sqrt{3}}{2}$ 3. $-3, 3, -2i\sqrt{2}, 2i\sqrt{2}$
- $-2i, 2i, -i\sqrt{5}, i\sqrt{5}$ 5. $0, 3, \frac{-3 \pm 3i\sqrt{3}}{2}$
- $\frac{1}{2}, \frac{1 \pm i\sqrt{3}}{4}$ 7. $-i, i, -i\sqrt{3}, i\sqrt{3}$ 8. $4, -2 \pm 2i\sqrt{3}$
- $\frac{3}{2}, \frac{3 \pm 3i\sqrt{3}}{4}$ 10. $-2, 2, -\sqrt{3}, \sqrt{3}$
- $-\sqrt{2}, \sqrt{2}, -i\sqrt{10}, i\sqrt{10}$ 12. $0, 2, -1 \pm i\sqrt{3}$
- $-\frac{\sqrt{15}}{3}, \frac{\sqrt{15}}{3}, -i\frac{\sqrt{15}}{3}, i\frac{\sqrt{15}}{3}$ 14. $-\frac{\sqrt{6}}{2}, \frac{\sqrt{6}}{2}, -i, i$
- $-i, i, -2i, 2i$ 16. $-2\sqrt{2}, 2\sqrt{2}, -i, i$ 17. $-2, 1 \pm i\sqrt{3}$
- $-2\sqrt{2}, 2\sqrt{2}, -i\sqrt{3}, i\sqrt{3}$

Reteaching 6-5

- $x^3 - 5x^2 + 9x - 5 = 0$ 2. $x^3 - 8x^2 + 9x + 58 = 0$
- $x^3 - 15x^2 + 73x - 111 = 0$ 4. $x^3 + 4x^2 - 2x - 8 = 0$
- $x^3 - 3x^2 - 3x + 1 = 0$ 6. $x^3 - 6x^2 + 6x = 0$
- $x^3 - 7x^2 + 9x - 63 = 0$ 8. $x^3 - 7x^2 + 11x + 3 = 0$
- $x^3 + 3x^2 + x + 3 = 0$ 10. $x^3 - 10x^2 + 18x - 16 = 0$
- $x^3 - x^2 + 25x - 25 = 0$
- $x^3 - 10x^2 + 33x - 34 = 0$
- $x^3 - 3x^2 + 16x - 48 = 0$ 14. $x^3 - 4x^2 + 5x = 0$
- $x^3 + 5x^2 - 15x - 7 = 0$
- $x^3 + 4x^2 - 7x - 28 = 0$

Reteaching 6-6

- $1, \frac{1 \pm i\sqrt{11}}{2}$ 2. $-5, 4 \pm 3i$ 3. $\frac{2}{3}, -\sqrt{5}, \sqrt{5}$
- $2, -2i, 2i$ 5. $-1, 1, -\sqrt{2}, \sqrt{2}$ 6. $-3, \frac{5 \pm \sqrt{33}}{2}$

Reteaching 6-7

- 60,480 2. 120 3. 66 4. 230,230 5. 720 6. 32,760 7. 120

Reteaching 6-8

- 4; 4; 2; 4; 3; y 2. 3; 3; 3; 2; y 3. 5; 5; 3; 10; 3; 5; z
- $x^5 + 5x^4y + 10x^3y^2 + 10x^2y^3 + 5xy^4 + y^5$
- $x^5 - 5x^4y + 10x^3y^2 - 10x^2y^3 + 5xy^4 - y^5$
- $8x^3 + 12x^2y + 6xy^2 + y^3$ 7. $x^4 + 12x^3y + 54x^2y^2 + 108xy^3 + 81y^4$ 8. $x^5 - 10x^4y + 40x^3y^2 - 80x^2y^3 + 80xy^4 - 32y^5$ 9. $32x^5 - 80x^4y + 80x^3y^2 - 40x^2y^3 + 10xy^4 - y^5$ 10. $x^4 - 12x^3y + 54x^2y^2 - 108xy^3 + 81y^4$ 11. $64x^3 - 48x^2y + 12xy^2 - y^3$ 12. $x^5 - 5x^4 + 10x^3 - 10x^2 + 5x - 1$ 13. $1 - 3x + 3x^2 - x^3$
- $x^6 + 3x^4 + 3x^2 + 1$ 15. $y^8 + 4y^6a + 6y^4a^2 + 4y^2a^3 + a^4$

Enrichment 6-1

KF GAUSS

Enrichment 6-2

- $(x - 24)(x - 36)$ 2. $(x - 9)(x - 16)$
- $(x - 32)(x + 4)$ 4. $(x - 54)(x + 10)$
- $(x + 15)(x + 66)$ 6. $(x - 32)(x - 18)$
- $(x - 7)(x + 24)$ 8. $(x - 35)(x + 18)$

Enrichment 6-3

READ IT CAREFULLY;

- 3; 10; 9; 4; 12; 2; 13; 6; 16; 15; 1; 11; 7; 14; 17

Enrichment 6-4

- 0 2. $b + c$ 3. $b = -c$ 4a. a^2 4b. bc 4c. $a^2 = -b^2$, $a^2 = -c^2$ 5. No; a^2 will always be a positive number, and $-b^2$ and $-c^2$ will always be negative numbers.

Chapter 6 Answers (continued)

21. $-0.59, 0, 0.42$ 22. $-0.67, 0, 1.4$ 23. $-9, 0, 9$
 24. $(n-1)n(n+1) = -336; -8, -7, -6$
 25. $(x-5)(x^2+5x+25)$ 26. $(x^2-3)(x^2-5)$
 27. $(x+1)(x-1)(x^2+2)$ 28. $(x+1)(x^2-x+1)$
 29. $(x^2-6)(x^2+4)$ 30. $(x^2+1)(x^2+9)$
 31. $(x+3)(x^2-3x+9)$ 32. $(x^2-2)(x^2+9)$
 33. $0, 1, \frac{-1 \pm i\sqrt{3}}{2}$ 34. $-1, 1, -\sqrt{6}, \sqrt{6}$
 35. $-\sqrt{14}, \sqrt{14}, -i, i$ 36. $-i\sqrt{2}, i\sqrt{2}, -2i\sqrt{2}, 2i\sqrt{2}$
 37. $-3, 3, -3i, 3i$ 38. $-\sqrt{5}, \sqrt{5}, -i\sqrt{5}, i\sqrt{5}$
 39. $0, -2, 2, -i\sqrt{3}, i\sqrt{3}$ 40. $0, 2, 6$

Practice 6-5

1. $2 - 3i, -\sqrt{7}$ 2. $3 + \sqrt{2}, 1 - \sqrt{3}$ 3. $4i, 6 + i$
 4. $5 + \sqrt{6}, -2 - \sqrt{10}$ 5. $x^4 - 8x^3 + 21x^2 - 32x + 68$
 6. $x^4 - 4x^3 - x^2 + 8x - 2$ 7. $x^4 + 3x^2 - 54$
 8. $x^4 - 6x^3 + 9x^2 + 6x - 20$ 9. $4, 2, -1$ 10. $3, 1, -5$
 11. $-4, -3, \frac{1}{2}$ 12. $7, -2, -4$ 13. $3, \frac{-3 \pm 3\sqrt{5}}{2}$
 14. $-2, -1, 1, 2$ 15. $2, 2 \pm i$ 16. $-1, 3 \pm i$ 17. $1, 2 \pm 3i$
 18. $-2, 1 \pm 2i$ 19. $1, -1, 5$ 20. $-4, 2$ 21. $-2, 1, 3$
 22. $10, -1 \pm i\sqrt{19}$ 23. $1, -3$ 24. $3, \frac{1}{2}, -\frac{1}{2}$
 25. $2, \frac{-3 \pm \sqrt{13}}{2}$ 26. $-3, \frac{2}{3}, \frac{1}{4}$
 27. $\pm 1, \pm 3, \pm 5, \pm 15$; none 28. $\pm 1, \pm 2, \pm 4, \pm \frac{1}{2}, \pm \frac{1}{3}, \pm \frac{2}{3},$
 $\pm \frac{4}{3}, \pm \frac{1}{4}, \pm \frac{1}{6}, \pm \frac{1}{9}, \pm \frac{2}{9}, \pm \frac{4}{9}, \pm \frac{1}{12}, \pm \frac{1}{18}, \pm \frac{1}{36}, -4, -\frac{1}{6}, \frac{1}{6}$
 29. $\pm 1, \pm \frac{1}{2}, -1, -\frac{1}{2}$ 30. $\pm 1, \pm 2, \pm 4, \pm \frac{1}{2}, \pm \frac{1}{3}, \pm \frac{2}{3}, \pm \frac{4}{3}, \pm \frac{1}{4},$
 $\pm \frac{1}{6}, \pm \frac{1}{12}$; none 31. $\pm 1, \pm \frac{1}{5}, \frac{1}{5}, 1$ 32. $\pm 1, \pm 7, \pm 49$; none
 33. $x^3 - 7x^2 + 17x - 15 = 0$ 34. $x^3 - 5x^2 + 4x - 20 = 0$
 35. $x^3 - 5x^2 + 4x + 10 = 0$ 36. $x^3 + 7x^2 + x + 7 = 0$
 37. $x^3 + 4x^2 + 16x + 64 = 0$ 38. $x^3 - 12x^2 + 49x - 78 = 0$

Practice 6-6

1. $-1, 0, 1$ 2. $-4, 0, 4$ 3. $-\frac{1}{3}, 0, \frac{1}{2}$ 4. $-\frac{1}{2}, 0, \frac{1}{3}$
 5. $-1, -\frac{1}{5}, 0$ 6. $-5, 0, 5$ 7. $2; 2 \text{ or } 0; \pm 1, \pm 3, \pm \frac{1}{2}, \pm \frac{3}{2}$
 8. $2; 2 \text{ or } 0; \pm 1, \pm 2, \pm 5, \pm 10, \pm \frac{1}{3}, \pm \frac{2}{3}, \pm \frac{5}{3}, \pm \frac{10}{3}$
 9. $4; 4, 2, \text{ or } 0; \pm 1, \pm 5, \pm \frac{1}{2}, \pm \frac{5}{2}$ 10. $3; 3 \text{ or } 1; \pm 1, \pm 3, \pm 9,$
 $\pm \frac{1}{2}, \pm \frac{3}{2}, \pm \frac{9}{2}, \pm \frac{1}{4}, \pm \frac{3}{4}, \pm \frac{9}{4}$ 11. $5; 5, 3, \text{ or } 1; \pm 1, \pm 3, \pm 5,$
 $\pm 15, \pm \frac{1}{2}, \pm \frac{3}{2}, \pm \frac{5}{2}, \pm \frac{15}{2}, \pm \frac{1}{3}, \pm \frac{5}{3}, \pm \frac{1}{6}, \pm \frac{5}{6}$ 12. $3; 3 \text{ or } 1;$
 $\pm 1, \pm 7$ 13. $3; 3 \text{ or } 1; \pm 1, \pm 2, \pm 3, \pm 4, \pm 6, \pm 12$
 14. $4; 4, 2, \text{ or } 0; \pm 1, \pm 2, \pm 3, \pm 6, \pm \frac{1}{2}, \pm \frac{3}{2}$ 15. $5; 5, 3, \text{ or } 1;$
 $\pm 1, \pm 2, \pm 3, \pm 6, \pm \frac{1}{2}, \pm \frac{3}{2}, \pm \frac{1}{4}, \pm \frac{3}{4}$ 16. $6; 6, 4, 2 \text{ or } 0; \pm 1, \pm 2,$
 $\pm 3, \pm 6, \pm 9, \pm 18, \pm \frac{1}{7}, \pm \frac{2}{7}, \pm \frac{3}{7}, \pm \frac{6}{7}, \pm \frac{9}{7}, \pm \frac{18}{7}$ 17. $5; 5, 3, \text{ or}$
 $1; \pm 1, \pm 5$ 18. $5; 5, 3, \text{ or } 1; \pm 1, \pm 2, \pm 3, \pm 6, \pm \frac{1}{2}, \pm \frac{3}{2}, \pm \frac{1}{4}, \pm \frac{3}{4}$

- $\pm \frac{1}{8}, \pm \frac{3}{8}$ 19. 3 20. $4, -3i, 3i$ 21. $-2, 1 \pm \sqrt{7}$
 22. $2, 1 \pm \sqrt{5}$ 23. $1, \frac{-1 \pm i\sqrt{5}}{2}$ 24. $-3, 1, 4$
 25. $-4, -i\sqrt{7}, i\sqrt{7}$ 26. $-1, -1 \pm i\sqrt{3}$ 27. $-3, 3, -2i, 2i$
 28. $-2, 2, -\sqrt{3}, \sqrt{3}$ 29. $-\frac{2}{3}, \frac{2}{3}, -i, i$
 30. $-\sqrt{3}, \sqrt{3}, -\frac{1}{2}i, \frac{1}{2}i$

Practice 6-7

1. combination 2. permutation 3. permutation 4. combina-
 tion 5. 12 6. 66 7. 792 8. 12 9. 1 10. 15 11. 1 12. 84
 13. 1 14. 252 15. 2002 16. 2, 118, 760 17. 40, 320 18. 110
 19. 17, 280 20. 360 21. 479, 001, 600 22. 239, 500, 800
 23. 95, 040 24. 12 25. 3024 26. 455 27. 60 28. 360
 29. true, comm. prop. of mult. 30. false; Let $a = 2$. $(2^2)! =$
 $24 \neq 4 = (2!)^2$ 31. false, Let $a = 2$ and $b = 3$. $2 \cdot 3! =$
 $12 \neq 720 = (2 \cdot 3)!$ 32. true; identity prop. of add.
 33. false; Let $a = 2$ and $b = 3$. $(2 + 3)! = 120 \neq 8 =$
 $2! + 3!$ 34. false; Let $a = 2$. $(2!)! = 2 \neq 4 = (2!)^2$

Practice 6-8

1. $x^4 + 8x^3 + 24x^2 + 32x + 16$ 2. $a^7 + 14a^6 + 84a^5$
 $+ 280a^4 + 560a^3 + 672a^2 + 448a + 128$ 3. $x^7 + 7x^6y$
 $+ 21x^5y^2 + 35x^4y^3 + 35x^3y^4 + 21x^2y^5 + 7xy^6 + y^7$
 4. $d^9 - 18d^8 + 144d^7 - 672d^6 + 2016d^5 - 4032d^4$
 $+ 5376d^3 - 4608d^2 + 2304d - 512$ 5. $256x^8 - 3072x^7$
 $+ 16128x^6 - 48384x^5 + 90720x^4 - 108864x^3 + 81648x^2$
 $- 34992x + 6561$ 6. $x^9 - 9x^8 + 36x^7 - 84x^6 + 126x^5$
 $- 126x^4 + 84x^3 - 36x^2 + 9x - 1$ 7. $64x^{12} - 384x^{10}y^2$
 $+ 960x^8y^4 - 1280x^6y^6 + 960x^4y^8 - 384x^2y^{10} + 64y^{12}$
 8. $x^{35} + 14x^{30}y + 84x^{25}y^2 + 280x^{20}y^3 + 560x^{15}y^4$
 $+ 672x^{10}y^5 + 448x^5y^6 + 128y^7$ 9. about 1%
 10a. about 99% 10b. about 95% 10c. about 5%
 11. about 3% 12. about 3% 13. about 8%
 14. about 0.6% 15. $n^3 - 9n^2 + 27n - 27$
 16. $16n^4 + 64n^3 + 96n^2 + 64n + 16$ 17. $n^5 - 30n^4$
 $+ 360n^3 - 2160n^2 + 6480n - 7776$ 18. $n^6 - 6n^5$
 $+ 15n^4 - 20n^3 + 15n^2 - 6n + 1$ 19. $8a^3 + 24a^2 + 24a$
 $+ 8$ 20. $x^8 - 4x^6y^2 + 6x^4y^4 - 4x^2y^6 + y^8$ 21. $32x^5 +$
 $240x^4y + 720x^3y^2 + 1080x^2y^3 + 810xy^4 + 243y^5$
 22. $64x^{12} + 192x^{10}y^2 + 240x^8y^4 + 160x^6y^6 + 60x^4y^8$
 $+ 12x^2y^{10} + y^{12}$ 23. $x^6 - 3x^4y^2 + 3x^2y^4 - y^6$
 24. $16b^4 + 32b^3c + 24b^2c^2 + 8bc^3 + c^4$
 25. $243m^5 - 810m^4n + 1080m^3n^2 - 720m^2n^3 + 240mn^4$
 $- 32n^5$ 26. $x^{18} - 6x^{15}y^4 + 15x^{12}y^8 - 20x^9y^{12}$
 $+ 15x^6y^{16} - 6x^3y^{20} + y^{24}$ 27. $x^7 + 7x^6 + 21x^5 + 35x^4$
 $+ 35x^3 + 21x^2 + 7x + 1$ 28. $x^8 + 32x^7 + 448x^6 +$
 $3584x^5 + 17920x^4 + 57344x^3 + 114688x^2 + 131072x$
 $+ 65536$ 29. $x^6 - 18x^5y + 135x^4y^2 - 540x^3y^3$
 $+ 1215x^2y^4 - 1458xy^5 + 729y^6$ 30. $x^5 + 10x^4 + 40x^3$
 $+ 80x^2 + 80x + 32$
 31. $x^{10} - 5x^8y^2 + 10x^6y^4 - 10x^4y^6 + 5x^2y^8 - y^{10}$
 32. $y^5 + 15y^4 + 90y^3 + 270y^2 + 405y + 243$
 33. $x^{12} + 18x^{10} + 135x^8 + 540x^6 + 1215x^4$