

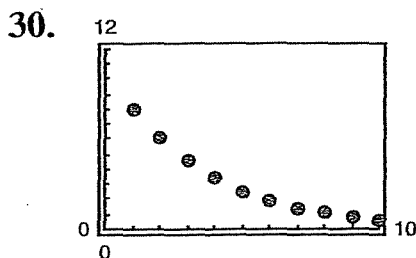
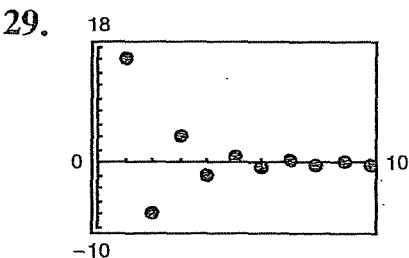
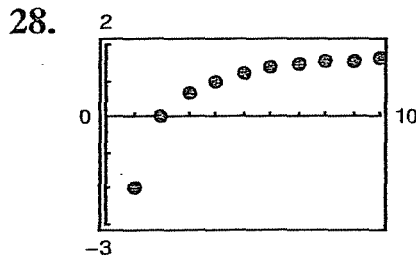
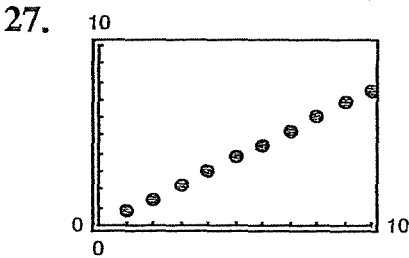
# Chapter 11

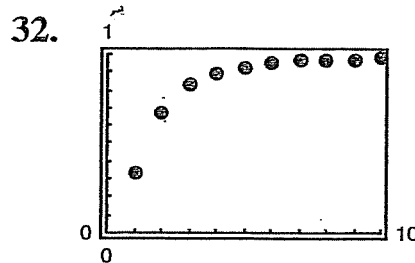
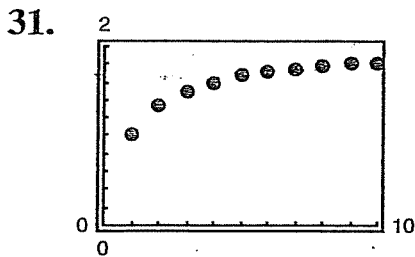
## Section 11.1 (page 811)

### Vocabulary Check (page 811)

1. infinite sequence    2. terms    3. finite
4. recursively    5. factorial
6. summation notation    7. index; upper; lower
8. series    9.  $n$ th partial sum

1. 4, 7, 10, 13, 16    2. 2, 7, 12, 17, 22    3. 2, 4, 8, 16, 32
4.  $\frac{1}{2}, \frac{1}{4}, \frac{1}{8}, \frac{1}{16}, \frac{1}{32}$     5. -2, 4, -8, 16, -32
6.  $-\frac{1}{2}, \frac{1}{4}, -\frac{1}{8}, \frac{1}{16}, -\frac{1}{32}$     7. 3, 2,  $\frac{5}{3}, \frac{3}{2}, \frac{7}{5}$     8.  $\frac{1}{3}, \frac{1}{2}, \frac{3}{5}, \frac{2}{3}, \frac{5}{7}$
9. 3,  $\frac{12}{11}, \frac{9}{13}, \frac{24}{47}, \frac{15}{37}$     10. 2,  $\frac{14}{9}, \frac{28}{19}, \frac{16}{11}, \frac{74}{51}$     11. 0, 1, 0,  $\frac{1}{2}, 0$
12. 0, 2, 0, 2, 0    13.  $\frac{5}{3}, \frac{17}{9}, \frac{53}{27}, \frac{161}{81}, \frac{485}{243}$     14.  $\frac{2}{3}, \frac{4}{9}, \frac{8}{27}, \frac{16}{81}, \frac{32}{243}$
15. 1,  $\frac{1}{2^{3/2}}, \frac{1}{3^{3/2}}, \frac{1}{8}, \frac{1}{5^{3/2}}$     16. 10,  $\frac{10}{\sqrt[3]{4}}, \frac{10}{\sqrt[3]{9}}, \frac{10}{\sqrt[3]{16}}, \frac{10}{\sqrt[3]{25}}$
17.  $-1, \frac{1}{4}, -\frac{1}{9}, \frac{1}{16}, -\frac{1}{25}$     18.  $-\frac{1}{2}, \frac{2}{3}, -\frac{3}{4}, \frac{4}{5}, -\frac{5}{6}$
19.  $\frac{2}{3}, \frac{2}{3}, \frac{2}{3}, \frac{2}{3}, \frac{2}{3}$     20. 0.3, 0.3, 0.3, 0.3, 0.3
21. 0, 0, 6, 24, 60    22. -5, -4, 9, 40, 95    23. -73
24. -240    25.  $\frac{44}{239}$     26.  $\frac{37}{130}$





33. c    34. b    35. d    36. a    37.  $a_n = 3n - 2$

38.  $a_n = 4n - 1$     39.  $a_n = n^2 - 1$

40.  $a_n = (-1)^{n+1}(2n)$     41.  $a_n = \frac{(-1)^n(n+1)}{n+2}$

42.  $a_n = \frac{(-1)^{n+1}}{2^n}$     43.  $a_n = \frac{n+1}{2n-1}$     44.  $a_n = \frac{2^{n-1}}{3^n}$

45.  $a_n = \frac{1}{n^2}$     46.  $a_n = \frac{1}{n!}$     47.  $a_n = (-1)^{n+1}$

48.  $a_n = \frac{2^{n-1}}{(n-1)!}$     49.  $a_n = 1 + \frac{1}{n}$     50.  $a_n = 1 + \frac{2^n - 1}{2^n}$

51. 28, 24, 20, 16, 12    52. 15, 18, 21, 24, 27

53. 3, 4, 6, 10, 18    54. 32, 16, 8, 4, 2

55. 6, 8, 10, 12, 14    56. 25, 20, 15, 10, 5

$a_n = 2n + 4$      $a_n = 30 - 5n$

57. 81, 27, 9, 3, 1    58. 14, -28, 56, -112, 224

$a_n = \frac{243}{3^n}$      $a_n = 14(-2)^{n-1}$

59.  $1, 3, \frac{9}{2}, \frac{9}{2}, \frac{27}{8}$     60.  $1, \frac{1}{2}, \frac{2}{3}, \frac{3}{2}, \frac{24}{5}$  undef, 1, 1, 2, 6

61.  $1, \frac{1}{2}, \frac{1}{6}, \frac{1}{24}, \frac{1}{120}$     62.  $0, \frac{1}{2}, \frac{2}{3}, \frac{3}{8}, \frac{2}{15}$

63.  $1, \frac{1}{2}, \frac{1}{24}, \frac{1}{720}, \frac{1}{40,320}$

64.  $-1, -\frac{1}{6}, -\frac{1}{120}, -\frac{1}{5040}, -\frac{1}{362,880}$

65.  $\frac{1}{30}$     66.  $\frac{1}{336}$     67. 90    68. 600    69.  $n + 1$

70.  $(n+2)(n+1)$     71.  $\frac{1}{2n(2n+1)}$     72.  $3n + 1$

73. 35    74. 57    75. 40    76. 25    77. 30

78. 110    79.  $\frac{9}{5}$     80.  $\frac{124}{429}$     81. 88    82. 238

(84) || (86) 6.06

(44)  $\frac{1}{2} \cdot \left(\frac{2}{3}\right)^n$

$$88. \frac{3}{8} \quad 89. \sum_{i=1}^9 \frac{1}{3i} \quad 90. \sum_{i=1}^{15} \frac{5}{1+i} \quad 91. \sum_{i=1}^8 \left[ 2 \left( \frac{i}{8} \right) + 3 \right]$$

$$92. \sum_{i=1}^6 \left[ 1 - \left( \frac{i}{6} \right)^2 \right] \quad 93. \sum_{i=1}^6 (-1)^{i+13^i} \quad 94. \sum_{i=0}^7 \left( -\frac{1}{2} \right)^i$$

$$95. \sum_{i=1}^{20} \frac{(-1)^{i+1}}{i^2} \quad 96. \sum_{i=1}^{10} \frac{1}{i(i+2)} \quad 97. \sum_{i=1}^5 \frac{2^i - 1}{2^{i+1}}$$

$$98. \sum_{i=1}^6 \frac{i!}{2^i} \quad 99. \frac{75}{16} \quad 100. \frac{242}{243} \quad 101. -\frac{3}{2}$$

$$102. -\frac{51}{32} \quad 103. \frac{2}{3} \quad 104. \frac{1}{9} \quad 105. \frac{7}{9} \quad 106. \frac{2}{9}$$

107. (a)  $A_1 = \$5100.00, A_2 = \$5202.00, A_3 = \$5306.04,$   
 $A_4 = \$5412.16, A_5 = \$5520.40, A_6 = \$5630.81,$   
 $A_7 = \$5743.43, A_8 = \$5858.30$   
 (b)  $A_{40} = \$11,040.20$

OR  $\sum_{i=1}^8 \frac{1}{(-2)^{i-1}}$

(94)  $\sum_{i=1}^8 \frac{(-1)^{i+1}}{2^{i-1}}$

108. (a)  $A_1 = \$101.00, A_2 = \$203.01, A_3 = \$306.04,$   
 $A_4 = \$410.10, A_5 = \$515.20, A_6 = \$621.35$

(b)  $A_{60} = \$8248.64$

(c)  $A_{240} = \$99,914.79$

109. (a)  $b_n = 60.57n - 182$

(b)  $c_n = 1.61n^2 + 26.8n - 9.5$

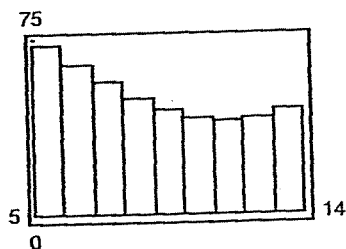
(c)

$n$	8	9	10	11	12	13
$a_n$	311	357	419	481	548	608
$b_n$	303	363	424	484	545	605
$c_n$	308	362	420	480	544	611

The quadratic model is a better fit.

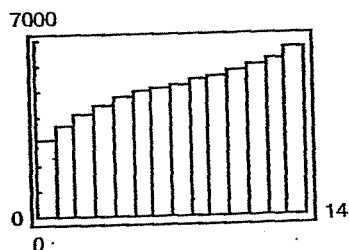
(d) The quadratic model; 995

110. (a)  $a_5 = 73.1, a_6 = 64.3, a_7 = 56.5, a_8 = 49.9,$   
 $a_9 = 44.8, a_{10} = 41.4, a_{11} = 40.1, a_{12} = 41.1,$   
 $a_{13} = 44.7$



(b) The number of cases reported fluctuates.

111. (a)  $a_0 = \$3102.9, a_1 = \$3644.3, a_2 = \$4079.6,$   
 $a_3 = \$4425.3, a_4 = \$4698.2, a_5 = \$4914.8,$   
 $a_6 = \$5091.8, a_7 = \$5245.7, a_8 = \$5393.2,$   
 $a_9 = \$5550.9, a_{10} = \$5735.5, a_{11} = \$5963.5,$   
 $a_{12} = \$6251.5, a_{13} = \$6616.3$



(b) The federal debt is increasing.