

Section 11.3 (page 831)

Vocabulary Check (page 831)

1. geometric; common      2.  $a_n = a_1 r^{n-1}$

3.  $S_n = a_1 \left( \frac{1-r^n}{1-r} \right)$       4. geometric series

5.  $S = \frac{a_1}{1-r}$

1. Geometric sequence,  $r = 3$
2. Geometric sequence,  $r = 4$
3. Not a geometric sequence
4. Not a geometric sequence
5. Geometric sequence,  $r = -\frac{1}{2}$
6. Geometric sequence,  $r = 0.2$
7. Geometric sequence,  $r = 2$
8. Geometric sequence,  $r = -\frac{2}{3}$
9. Not a geometric sequence
10. Not a geometric sequence
11. 2, 6, 18, 54, 162
12. 6, 12, 24, 48, 96
13.  $1, \frac{1}{2}, \frac{1}{4}, \frac{1}{8}, \frac{1}{16}$
14.  $1, \frac{1}{3}, \frac{1}{9}, \frac{1}{27}, \frac{1}{81}$
15.  $5, -\frac{1}{2}, \frac{1}{20}, -\frac{1}{200}, \frac{1}{2000}$
16.  $6, -\frac{3}{2}, \frac{3}{8}, -\frac{3}{32}, \frac{3}{128}$
17.  $1, e, e^2, e^3, e^4$
18.  $3, 3\sqrt{5}, 15, 15\sqrt{5}, 75$
19.  $2, \frac{x}{2}, \frac{x^2}{8}, \frac{x^3}{32}, \frac{x^4}{128}$
20.  $5, 10x, 20x^2, 40x^3, 80x^4$
21.  $64, 32, 16, 8, 4; r = \frac{1}{2}; a_n = 128\left(\frac{1}{2}\right)^n$
22.  $81, 27, 9, 3, 1; r = \frac{1}{3}; a_n = 243\left(\frac{1}{3}\right)^n$
23.  $7, 14, 28, 56, 112; r = 2; a_n = \frac{7}{2}(2)^n$
24.  $5, -10, 20, -40, 80; r = -2; a_n = -\frac{5}{2}(-2)^n$
25.  $6, -9, \frac{27}{2}, -\frac{81}{4}, \frac{243}{8}; r = -\frac{3}{2}; a_n = -4\left(-\frac{3}{2}\right)^n$
26.  $48, -24, 12, -6, 3; r = -\frac{1}{2}; a_n = -96\left(-\frac{1}{2}\right)^n$
27.  $a_n = 4\left(\frac{1}{2}\right)^{n-1}; \frac{1}{128}$
28.  $a_n = 5\left(\frac{3}{2}\right)^{n-1}; \frac{10,935}{128}$
29.  $a_n = 6\left(-\frac{1}{3}\right)^{n-1}; -\frac{2}{3^{10}}$

30.  $a_n = 64\left(-\frac{1}{4}\right)^{n-1}; -\frac{1}{4096}$       31.  $a_n = 100e^{x(n-1)}; 100e^{8x}$

32.  $a_n = (\sqrt{3})^{n-1}; 27\sqrt{3}$

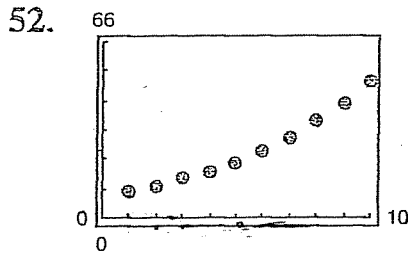
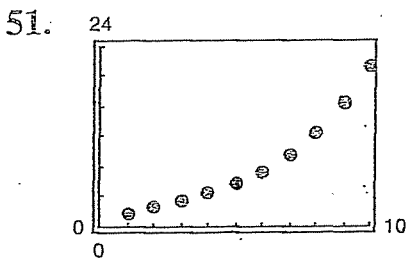
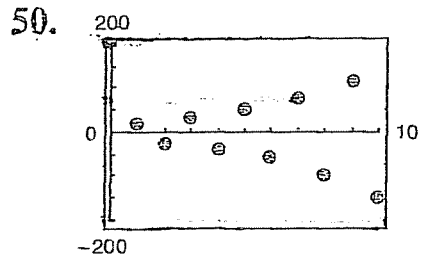
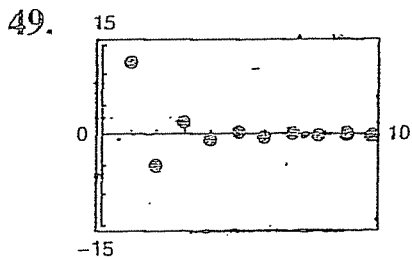
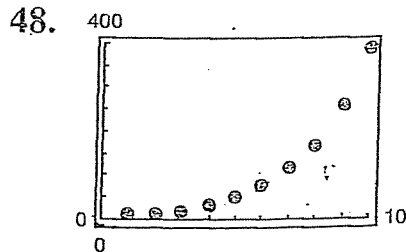
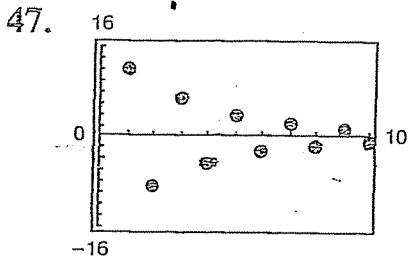
33.  $a_n = 500(1.02)^{n-1}; \approx 1082.372$

34.  $a_n = 1000(1.005)^{n-1}; \approx 1342.139$       35. 45,927

36. 8,957,952      37. 50,388,480      38. 8,388,608

39.  $a_3 = 9$       40.  $a_1 = 12$       41.  $a_6 = -2$

42.  $a_7 = \frac{256}{243}$       43. a      44. c      45. b      46. d



53. 511      54. 6357.162      55. 171      56.  $-\frac{6305}{128}$

57. 43      58. 2.667      59.  $\frac{1365}{32}$       60.  $\frac{4095}{128}$

61. 29,921,311      62. 12.500      63. 592.647      64.  $\frac{25}{2}$

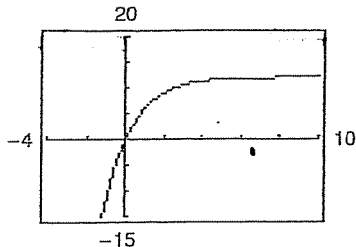
65. 2092.596      66. 3949.147      67.  $\frac{8}{5}$       68. 45.000

69. 6.400      70. 5.333      71. 3.750      72. 45

73.  $\sum_{n=1}^7 5(3)^{n-1}$       74.  $\sum_{n=1}^8 7(2)^{n-1}$       75.  $\sum_{n=1}^7 2\left(-\frac{1}{4}\right)^{n-1}$

76.  $\sum_{n=1}^6 15\left(-\frac{1}{5}\right)^{n-1}$       77.  $\sum_{n=1}^6 0.1(4)^{n-1}$       78.  $\sum_{n=1}^5 32\left(\frac{3}{4}\right)^{n-1}$

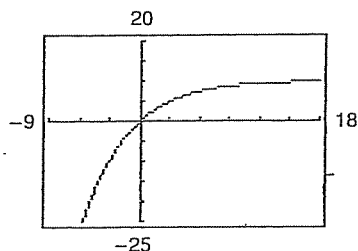
79. 2    80. 6    81.  $\frac{2}{3}$     82.  $\frac{6}{5}$     83.  $\frac{16}{3}$     84.  $\frac{10}{9}$   
 85.  $\frac{5}{3}$     86. 5    87. -30    88.  $-\frac{25}{2}$     89. 32  
 90. 27    91. Undefined    92. Undefined    93.  $\frac{4}{11}$   
 94.  $\frac{11}{37}$     95.  $\frac{7}{22}$     96.  $\frac{25}{18}$   
 97.



Horizontal asymptote:  $y = 12$

Corresponds to the sum of the series

98.



Horizontal asymptote:  $y = 10$

Corresponds to the sum of the series

99. (a)  $a_n = 1190.88(1.006)^n$   
 (b) The population is growing at a rate of 0.6% per year.  
 (c) 1342.2 million. This value is close to the prediction.  
 (d) 2007
100. (a) \$1790.85    (b) \$1806.11    (c) \$1814.02  
 (d) \$1819.40    (e) \$1822.03
101. (a) \$3714.87    (b) \$3722.16    (c) \$3725.85  
 (d) \$3728.32    (e) \$3729.52
102. \$22,689.45    103. \$7011.89    104. \$3698.34
- 105-106. Answers will vary.

107. (a) \$26,198.27    (b) \$26,253.88

108. (a) \$33,534.21    (b) \$33,551.91

109. (a) \$118,590.12    (b) \$118,788.73

110. (a) \$76,122.54    (b) \$76,533.16

111. Answers will vary.    112. \$222,289.91

113. \$1600    114. \$1250    115.  $\approx$  \$2181.82

116. \$2000    117. 126 square inches

118.  $S =$  \$2653.80 million    119. \$3,623,993.23

120. (a) 152.42 feet.    (b) 19 seconds