Chapter # 9 Practice Section:_____, Date:_____Name_____

Write out the first five terms of the sequence.

1) $a_n = 3n - 1$

2) $a_n = 3^n$

3) $a_n = \frac{2}{n^2}$

4) $a_n = 4(2n - 1)$

5) $a_n = \frac{4n - 1}{n^2 + 4n}$

6) $a_n = \frac{n^2 - 8}{n^2 + 8}$

7) $a_n = (-1)^{n-1}(2n - 4)$

Decide whether the given sequence is finite or infinite.

8) 6, 7, 8, 9

9) 4, 5, 6, 7, ...

10) –2, –1, 0, 1, ...

Find the first six terms of the sequence.

11) $a_1 = 4$, $a_n = a_{n-1} + 6$

12) $a_1 = -2$, $a_n = 3 \cdot a_{n-1}$

13) $a_1 = 6$, $a_2 = 6$; for $n \geq 3$, $a_n = a_{n-1} + a_{n-2}$

14) $a_1 = 9$, $a_2 = 10$; for $n \geq 3$, $a_n = a_{n-1} + a_{n-2}$

Evaluate the sum. Round to two decimal places, if necessary.

15) $\sum_{k=2}^{5} (3k - 4)$

16) $\sum_{k=1}^{4} (k^2 - 2)$

17) $\sum_{k=2}^{5} 4^k$

18) $\sum_{k=3}^{6} \frac{(k^2 - 3)}{2}$

19) $\sum_{i=2}^{5} (2i - 3)$

20) $\sum_{i=4}^{7} \frac{7}{i}$

21) $\sum_{i=1}^{4} (i - 9)^{-1}$

22) $\sum_{k=1}^{4} (-1)^k(k + 18)$

23) $\sum_{k=2}^{5} (-1)^{k+1}(k + 4)^2$

Evaluate the sum using the given information.

24) $x_1 = 4$, $x_2 = 3$, $x_3 = 0$, and $x_4 = 1$

$\sum_{i=1}^{4} (-x_i^2 - 2)$

25) $x_1 = 3$, $x_2 = -2$, $x_3 = -3$, $x_4 = -1$, and $x_5 = 4$

$\sum_{i=1}^{5} (-2x_i + 4)$

Use the summation properties to evaluate the series. The following rules may be needed: $\sum_{i=1}^{n} i = \frac{n(n+1)}{2}$;

$\sum_{i=1}^{n} i^2 = \frac{n(n+1)(2n+1)}{6}$; $\sum_{i=1}^{n} i^3 = \frac{n^2(n+1)^2}{4}$.

26) $\sum_{i=1}^{4} -3i$

27) $\sum_{i=1}^{5} (-2i^2 + 3i - 1)$

28) $\sum_{i=1}^{6} (-4i^2 + i)$

29) $\sum_{i=1}^{3} (-2 - 4i^3)$

Write the series using summation notation.

30) $\frac{3}{1 \cdot 2} + \frac{4}{2 \cdot 3} + \frac{5}{3 \cdot 4} + \frac{6}{4 \cdot 5} + \frac{7}{5 \cdot 6}$

31) $1^6 + 2^6 + 3^6 + 4^6 + \ldots$

32) $1 + \frac{1}{2^{18}} + \frac{1}{3^{18}} + \frac{1}{4^{18}} + \frac{1}{5^{18}}$

Solve the problem.

33) Suppose that certain bacteria can double their size and divide every 30 minutes. Write a recursive sequence that describes this growth where each value of n represents a 30–minute interval. Let $a_1 = 498$ represent the initial number of bacteria present.

34) The series $\ln(x) = (x - 1) - \frac{(x - 1)^2}{2} + \frac{(x - 1)^3}{3} - \ldots + (-1)^{n-1}\frac{(x - 1)^n}{n}$ can be used to estimate the value of ln(a) for any positive real number a such that $0 < a \leq 2$. Use the first five terms of this series to estimate ln(0.25). Round to the nearest thousandth.

Find the common difference for the arithmetic sequence.

35) 6, 9, 12, 15, ...

36) 3, 5, 7, 9, ...

Write the first n terms of the given arithmetic sequence (the value of n is indicated in the question).

37) The first term is 21, and the common difference is 6; n = 5

38) $a_1 = 1$, d = 2, n = 6

39) $a_3 = 7$, d = –5, n = 5

Find the first term and the common difference for the arithmetic sequence. Round approximations to the nearest hundredth.

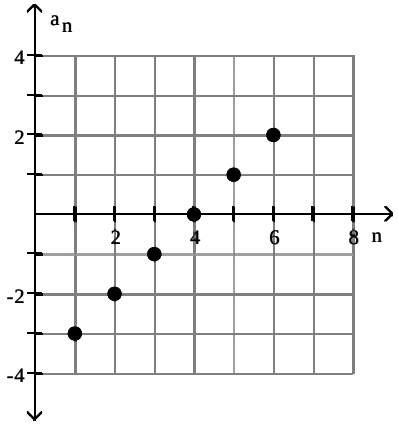
40) $a_{16} = 105$, $a_{81} = 365$

41) $a_{16} = 190,\ a_{70} = 892$

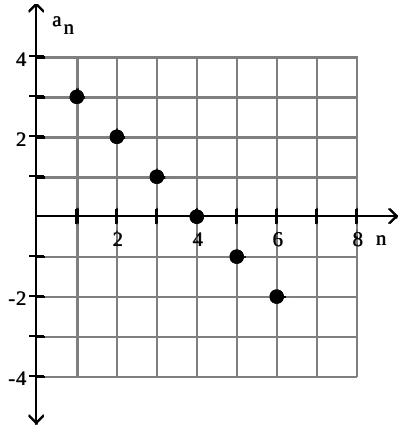
42) $S_5 = 70,\ a_5 = 20$

Find a formula for the nth term of the arithmetic sequence shown in the graph.

43)



44)



Find the sum of the first n terms of the following arithmetic sequence.

45) $a_1 = 4,\ d = -1;\ n = 6.$

46) $a_1 = -12,\ d = 5;\ n = 4.$

47) $a_2 = -96,\ a_5 = -300;\ n = 10$

Solve the problem.

48) Find the sum of the first 201 positive integers.

49) Find the sum of the first 220 positive even integers.

Evaluate the sum.

50) $\sum_{j=5}^{17} (7j - 5)$

51) $\sum_{i=1}^{4500} i$

Solve the problem.

52) Find the sum of all the integers from 52 to 96.

53) A man earned $3000 the first year he worked. If he received a raise of $400 at the end of each year, what was his salary during the 15th year?

54) A stack of poles has 28 poles in the bottom row, 27 poles in the next row, and so on, with 5 poles in the top row. How many poles are there in the stack?

Find the nth term of the geometric sequence.

55) $a_1 = 2, r = -3, n = 8$

56) $a_1 = \frac{1}{2}, r = \frac{1}{3}, n = 6$

57) $4, 8, 16, \ldots; n = 7$

58) $2, -6, 18, \ldots; n = 6$

59) $\frac{1}{2}, \frac{1}{6}, \frac{1}{18}, \ldots; n = 5$

Find a general term a_n for the geometric sequence.

60) $a_1 = 2, r = 2$

61) $a_1 = 7, r = \frac{7}{3}$

62) $a_1 = \frac{1}{6}, r = -8$

Find the first term and the common ratio for the geometric sequence. Round approximations to the nearest hundredth.

63) $a_2 = 16, a_7 = 512$

64) $a_2 = -14, a_5 = 112$

Use the formula for S_n to find the sum of the first five terms of the geometric sequence.

65) 3, 12, 48, 192, . . .

66) $\frac{4}{3}, \frac{8}{3}, \frac{16}{3}, \frac{32}{3}, \ldots$

67) $a_1 = 9.506$, r = 2.842 (Round to the nearest hundredth)

Find the sum of the geometric series.

68) $\sum_{i=1}^{5} 4(2)^i$

69) $\sum_{k=1}^{5} 4(-2)^k$

70) $\sum_{k=1}^{5} \frac{2}{3}(2)^k$

Find the common ratio r for the given infinite geometric sequence.

71) 4, 16, 64, 256, 1024, ...

72) 1, –3, 9, –27, 81, ...

73) $\frac{3}{2}, \frac{3}{8}, \frac{3}{32}, \frac{3}{128}, \frac{3}{512}, \ldots$

Evaluate the series, if it converges.

74) $6 + \frac{24}{5} + \frac{96}{25} + \frac{384}{125} + \ldots$

75) $8 - \frac{24}{5} + \frac{72}{25} - \frac{216}{125} + \ldots$

76) $-9 - \frac{18}{5} - \frac{36}{25} - \frac{72}{125} + \ldots$

77) $-8 - \frac{40}{3} - \frac{200}{9} - \frac{1000}{27} + \ldots$

Solve the problem.

78) A woman borrowed $10,000 at 14% interest compounded annually. If the loan was paid off in one lump sum at the end of 4 years, how much did she pay?

79) A town has a population of 3000 people and is increasing by 9% every year. What will the population be at the end of 8 years?

80) A ball is dropped from a height of 6.0 m. On each upward bounce the ball returns to $\frac{1}{2}$ of its previous height.

Find the total vertical distance the ball travels before coming to rest.

Answer Key
Testname: PP9

1) 2, 5, 8, 11, 14
2) 3, 9, 27, 81, 243
3) $2, \frac{1}{2}, \frac{2}{9}, \frac{1}{8}, \frac{2}{25}$
4) 4, 12, 20, 28, 36
5) $\frac{3}{5}, \frac{7}{12}, \frac{11}{21}, \frac{15}{32}, \frac{19}{45}$
6) $-\frac{7}{9}, -\frac{1}{3}, \frac{1}{17}, \frac{1}{3}, \frac{17}{33}$
7) –2, –0, 2, –4, 6
8) Finite
9) Infinite
10) Infinite
11) 4, 10, 16, 22, 28, 34
12) –2, –6, –18, –54, –162, –486
13) 6, 6, 12, 18, 30, 48
14) 9, 10, 19, 29, 48, 77
15) 26
16) 22
17) 1360
18) 37
19) 16
20) 5.32
21) –0.63
22) 2
23) 30
24) –34
25) 18
26) – 30
27) – 70
28) – 343
29) – 150
30) $\sum_{i=1}^{5} \frac{i+2}{i(i+1)}$
31) $\sum_{k=1}^{\infty} k^6$
32) $\sum_{k=1}^{5} \frac{1}{k^{18}}$
33) $a_1 = 498; \quad a_n = 2\,a_{n-1} \quad \text{for } n > 1.$
34) –1.298
35) 3
36) 2
37) 21, 27, 33, 39, 45
38) 1, 3, 5, 7, 9, 11
39) 17, 12, 7, 2, –3
40) $a_1 = 45, d = 4$
41) $a_1 = -5, d = 13$
42) $a_1 = 8, d = 3$
43) $a_n = n - 4$
44) $a_n = 4 - n$
45) 9
46) –18
47) –3340
48) 20301
49) 48,620
50) 936
51) 10,127,250
52) 3330
53) $8600
54) 396
55) $a_8 = -4374$
56) $a_6 = \frac{1}{486}$
57) 256
58) –486
59) $\frac{1}{162}$
60) $a_n = 2(2)^{n-1}$
61) $a_n = 7 \cdot \left(\frac{7}{3}\right)^{n-1}$
62) $a_n = \frac{1}{6} \cdot (-8)^{n-1}$
63) $a_1 = 8, r = 2$
64) $a_1 = 7, r = -2$
65) 1023
66) $\frac{124}{3}$
67) 951.66
68) 248
69) –88
70) $\frac{124}{3}$
71) 4
72) –3
73) $\frac{1}{4}$
74) 30
75) 5
76) – 15
77) Does not converge
78) $16,889.60
79) 5978 people

80) 18.0 m