Completion /52

Secondary Math 3 Name Key

Unit 11 Sequences and Series Review

Date _____ Period ____

For each sequence, state if it is arithmetic, geometric, or neither.

1) $\frac{3}{4}, \frac{3}{8}, \frac{3}{16}, \frac{3}{32}, \frac{3}{64}, \ldots$

Geometric

2) $-3, -\frac{9}{4}, -\frac{9}{5}, -\frac{3}{2}, -\frac{9}{7}, \ldots$

Neither

3) $\frac{25}{4}, 5, \frac{25}{6}, \frac{25}{7}, \frac{25}{8}, \ldots$

Neither

4) $-\frac{13}{9}, -\frac{7}{9}, -\frac{1}{9}, \frac{5}{9}, \frac{11}{9}, \ldots$

Aritmetic

Find the explicit formula and the recursive formula.

5) $-24, 76, 176, 276, \ldots$

E: $a_n = -24 + 100(n-1)$

R: $a_n = a_{n-1} + 100$, $a_1 = -24$

6) $4, -2, -8, -14, \ldots$

E: $a_n = 4 - 6(n-1)$

R: $a_n = a_{n-1} - 6$, $a_1 = 4$

7) $-14, 186, 386, 586, \ldots$

E: $a_n = -14 + 200(n-1)$

R: $a_n = a_{n-1} + 200$, $a_1 = -14$

8) $4, -8, 16, -32, \ldots$

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

R: $a_n = -2a_{n-1}$, $a_1 = 4$

9) $-3, -15, -75, -375, \ldots$

E: $a_n = -3(5)^{n-1}$

R: $a_n = 5a_{n-1}$, $a_1 = -3$

10) $1, 2, 4, 8, \ldots$

E: $a_n = 2^{n-1}$

R: $a_n = 2a_{n-1}$, $a_1 = 1$

Given the recursive formula, find the explicit formula.

11) $a_n = a_{n-1} + 200$, $a_1 = -18$

$a_n = -18 + 200(n-1)$

12) $a_n = a_{n-1} - 8$, $a_1 = -26$

$a_n = -26 - 8(n-1)$

13) $a_n = a_{n-1} - 6$, $a_1 = -30$

$a_n = -30 - 6(n-1)$

14) $a_n = a_{n-1} \cdot 4$, $a_1 = 2$

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

15) $a_n = a_{n-1} \cdot 3$, $a_1 = 4$

$a_n = 4(3)^{n-1}$

16) $a_n = a_{n-1} \cdot -2$, $a_1 = -4$

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

Find the missing term or terms in each arithmetic sequence.

17) ..., 21, 31, 41, 51, 61, 71, ...

18) ..., 28, 21, 14, 7, 0, -7, ...

19) ..., -27, -23, -19, ...

20) ..., 11, 18, 25, 32, ...

Find the missing term or terms in each geometric sequence.

21) ..., -3, -18, -108, ...

22) ..., -2, -6, -18, -54, -162, ...

23) ..., 2, 10, 50, 250, ...

24) ..., -3, -6, -12, -24, -48, -96, ...

Evaluate each series.

25) $\sum_{k=1}^{6}(30-k^2)$ 89

26) $\sum_{n=1}^{6}(40-n)$ 219

27) $\sum_{n=1}^{7}n(n-2)$ 84

28) $\sum_{k=1}^{5}(2k^2-3)$ 95

Write the following series in summation notation.

29) $1+(-2)+(-5)+(-8)...,\ n=19$

$\sum_{n=1}^{19}1-3(n-1)$

30) $12+19+26+33...,\ n=20$

$\sum_{n=1}^{20}12+7(n-1)$

31) $(-21)+(-27)+(-33)+(-39)...,\ n=18$

$\sum_{n=1}^{18}-21-6(n-1)$

32) $(-5)+(-7)+(-9)+(-11)...,\ n=8$

$\sum_{n=1}^{8}-5-2(n-1)$

Write the following series in summation notation.

33) $-2-10-50-250...,\ n=9$

$\sum_{n=1}^{9}-2(5)^{n-1}$

34) $-4-12-36-108...,\ n=9$

$\sum_{n=1}^{9}-4(3)^{n-1}$

35) $-2-6-18-54...,\ n=7$

$\sum_{n=1}^{7}-2(3)^{n-1}$

36) $-4-8-16-32...,\ n=8$

$\sum_{n=1}^{8}-4(2)^{n-1}$

Evaluate each arithmetic series described.

37) $11 + 17 + 23 + 29..., n = 13$

611

38) $28 + 38 + 48 + 58..., n = 15$

1470

Evaluate each geometric series described.

39) $-1 - 3 - 9 - 27..., n = 9$

-9841

40) $-3 + 6 - 12 + 24..., n = 9$

-513

41) A marching band formation consists of 6 rows. The first row has 9 musicians, the second has 11, the third has 13 and so on. How many musicians are in the last row and how many musicians are there in all?

Last row: 19

Total: 84

42) This month, your friend deposits $400 to save for a vacation. She plans to deposit 10% more each successive month for the next 11 months. How much will she have saved after the 12 deposits?

$1,037.50

43) An embroidery pattern calls for 5 stitches in the first row and for three more stitches in each successive row. The 25th row, which is the last row, has 77 stitches. Find the total number of stitches in the pattern.

1,025 stitches

44) Each year, a volunteer organization expects to add 5 more people to the number of shut-ins for whom the group provides home maintenance services. This year, the organization provides the service for 32 people.

a. Write a recursive formula for the number of people the organization expects to serve each year.

$a_n = a_{n-1} + 5, \quad a_1 = 32$

b. Write the first five terms of the sequence.

32, 37, 42, 47, 52

c. Write an explicit formula for the number of people the organization expects to serve each year.

$a_n = 32 + 5(n-1)$

d. How many people would the organization expect to serve in the 20th year?

152 people

Determine if each geometric series converges or diverges. If it converges, find the sum.

45) $3 + 9 + 27 + 81\ldots$

Diverges

46) $5 - 1 + \frac{1}{5} - \frac{1}{25}\ldots$

Converges, $\frac{25}{6}$ or 4.17

47) $1 - \frac{1}{2} + \frac{1}{4} - \frac{1}{8}\ldots$

Converges, $\frac{2}{3}$ or .67

48) $3 - 6 + 12 - 24\ldots$

Diverges

Expand completely.

49) $(2 + x)^6$

$64 + 192x + 240x^2 + 160x^3 + 60x^4 + 12x^5 + x^6$

50) $(3y + 1)^3$

$27y^3 + 27y^2 + 9y + 1$

51) $(x + 4)^4$

$x^4 + 16x^3 + 96x^2 + 256x + 256$

52) $(u - v)^5$

$u^5 - 5u^4v + 10u^3v^2 - 10u^2v^3 + 5uv^4 - v^5$