Secondary I   Name_____

4.3 Arithmetic and Geometric Sequences Worksheet

Period____

Determine if the sequence is arithmetic. If it is, find the common difference.

1) −9, −109, −209, −309, ...

2) 28, 18, 8, −2, ...

3) 28, 26, 24, 22, ...

4) −16, −6, 4, 14, ...

5) −8, −4, 0, 4, ...

6) $1, \dfrac{1}{2}, 0, -\dfrac{1}{2}, ...$

Find the common difference and the three terms in the sequence after the last one given.

7) −39, −33, −27, −21, ...

8) −27, −17, −7, 3, ...

9) 17, 13, 9, 5, ...

10) $\dfrac{1}{5}, \dfrac{23}{15}, \dfrac{43}{15}, \dfrac{21}{5}, ...$

Find the common difference and the recursive formula.

11) 9, 19, 29, 39, ...

12) 22, 19, 16, 13, ...

13) −3, 97, 197, 297, ...

14) 34, 43, 52, 61, ...

Find the common difference, the term named in the problem, and the explicit formula.

15) $17,\ 11,\ 5,\ -1,\ ...$
Find a_{39}

16) $5,\ -5,\ -15,\ -25,\ ...$
Find a_{20}

17) $-40,\ -47,\ -54,\ -61,\ ...$
Find a_{29}

18) $-32,\ -132,\ -232,\ -332,\ ...$
Find a_{40}

19) $-8,\ 22,\ 52,\ 82,\ ...$
Find a_{20}

20) $29,\ 38,\ 47,\ 56,\ ...$
Find a_{29}

21) $36,\ 29,\ 22,\ 15,\ ...$
Find a_{29}

22) $-20,\ -29,\ -38,\ -47,\ ...$
Find a_{20}

Determine if the sequence is geometric. If it is, find the common ratio.

23) $-2,\ -10,\ -50,\ -250,\ ...$

24) $-1,\ 6,\ -36,\ 216,\ ...$

25) $-1,\ -5,\ -25,\ -125,\ ...$

26) $-2,\ 10,\ -50,\ 250,\ ...$

27) $-3,\ -1,\ -\dfrac{1}{3},\ -\dfrac{1}{9},\ ...$

28) $-2,\ \dfrac{1}{2},\ -\dfrac{1}{8},\ \dfrac{1}{32},\ ...$

Find the common ratio and the three terms in the sequence after the last one given.

29) −2, −8, −32, −128, ...

30) 2, −8, 32, −128, ...

31) 3, −6, 12, −24, ...

32) 2, 10, 50, 250, ...

Find the common ratio and the recursive formula.

33) −1, 5, −25, 125, ...

34) −3, −15, −75, −375, ...

35) 3, −15, 75, −375, ...

36) 0.5, 1, 2, 4, ...

Find the common ratio, the term named in the problem, and the explicit formula.

37) 4, 12, 36, 108, ...
   Find a_9

38) −2, 6, −18, 54, ...
   Find a_{12}

39) −3, 9, −27, 81, ...
   Find a_{10}

40) −4, 8, −16, 32, ...
   Find a_{11}

41) −4, −12, −36, −108, ...
   Find a_{12}

42) 4, 8, 16, 32, ...
   Find a_{10}

43) $-20, -10, -5, -\dfrac{5}{2}, \ldots$

Find a_9

44) $\dfrac{1}{2}, \dfrac{1}{6}, \dfrac{1}{18}, \dfrac{1}{54}, \ldots$

Find a_{12}

Given the first term and the common difference of an arithmetic sequence find the explicit formula and the three terms in the sequence after the last one given.

45) $a_1 = 35, \ d = -20$

46) $a_1 = 22, \ d = -9$

47) $a_1 = -34, \ d = -2$

48) $a_1 = -22, \ d = -30$

Given the first term and the common ratio of a geometric sequence find the explicit formula and the three terms in the sequence after the last one given.

49) $a_1 = 4, \ r = -4$

50) $a_1 = -2, \ r = 4$

51) $a_1 = 1, \ r = 3$

52) $a_1 = -3, \ r = -5$

Find the missing term or terms in each arithmetic sequence.

53) $\ldots, -6, \ \underline{\quad}, 8, \ldots$

54) $\ldots, 30, \ \underline{\quad}, \ \underline{\quad}, 0, \ldots$

55) $\ldots, -14, \ \underline{\quad}, \ \underline{\quad}, 46, \ldots$

56) $\ldots, 38, \ \underline{\quad}, \ \underline{\quad}, 65, \ldots$

Name_____

4.3 Arithmetic and Geometric Sequences Worksheet

Period_____

Determine if the sequence is arithmetic. If it is, find the common difference.

1) $-9, -109, -209, -309, ...$

   $d = -100$

2) $28, 18, 8, -2, ...$

   $d = -10$

3) $28, 26, 24, 22, ...$

   $d = -2$

4) $-16, -6, 4, 14, ...$

   $d = 10$

5) $-8, -4, 0, 4, ...$

   $d = 4$

6) $1, \dfrac{1}{2}, 0, -\dfrac{1}{2}, ...$

   $d = -\dfrac{1}{2}$

Find the common difference and the three terms in the sequence after the last one given.

7) $-39, -33, -27, -21, ...$

   Common Difference: $d = 6$
   Next 3 terms: $-15, -9, -3$

8) $-27, -17, -7, 3, ...$

   Common Difference: $d = 10$
   Next 3 terms: $13, 23, 33$

9) $17, 13, 9, 5, ...$

   Common Difference: $d = -4$
   Next 3 terms: $1, -3, -7$

10) $\dfrac{1}{5}, \dfrac{23}{15}, \dfrac{43}{15}, \dfrac{21}{5}, ...$

   Common Difference: $d = \dfrac{4}{3}$
   Next 3 terms: $\dfrac{83}{15}, \dfrac{103}{15}, \dfrac{41}{5}$

Find the common difference and the recursive formula.

11) $9, 19, 29, 39, ...$

   Common Difference: $d = 10$
   Recursive: $a_n = a_{n-1} + 10$
   $a_1 = 9$

12) $22, 19, 16, 13, ...$

   Common Difference: $d = -3$
   Recursive: $a_n = a_{n-1} - 3$
   $a_1 = 22$

13) $-3, 97, 197, 297, ...$

   Common Difference: $d = 100$
   Recursive: $a_n = a_{n-1} + 100$
   $a_1 = -3$

14) $34, 43, 52, 61, ...$

   Common Difference: $d = 9$
   Recursive: $a_n = a_{n-1} + 9$
   $a_1 = 34$

Find the common difference, the term named in the problem, and the explicit formula.

15) $17, 11, 5, -1, ...$
Find a_{39}

Common Difference: $d = -6$
$a_{39} = -211$
Explicit: $a_n = 17 + (n - 1) \cdot -6$

16) $5, -5, -15, -25, ...$
Find a_{20}

Common Difference: $d = -10$
$a_{20} = -185$
Explicit: $a_n = 5 + (n - 1) \cdot -10$

17) $-40, -47, -54, -61, ...$
Find a_{29}

Common Difference: $d = -7$
$a_{29} = -236$
Explicit: $a_n = -40 + (n - 1) \cdot -7$

18) $-32, -132, -232, -332, ...$
Find a_{40}

Common Difference: $d = -100$
$a_{40} = -3932$
Explicit: $a_n = -32 + (n - 1) \cdot -100$

19) $-8, 22, 52, 82, ...$
Find a_{20}

Common Difference: $d = 30$
$a_{20} = 562$
Explicit: $a_n = -8 + (n - 1) \cdot 30$

20) $29, 38, 47, 56, ...$
Find a_{29}

Common Difference: $d = 9$
$a_{29} = 281$
Explicit: $a_n = 29 + (n - 1) \cdot 9$

21) $36, 29, 22, 15, ...$
Find a_{29}

Common Difference: $d = -7$
$a_{29} = -160$
Explicit: $a_n = 36 + (n - 1) \cdot -7$

22) $-20, -29, -38, -47, ...$
Find a_{20}

Common Difference: $d = -9$
$a_{20} = -191$
Explicit: $a_n = -20 + (n - 1) \cdot -9$

Determine if the sequence is geometric. If it is, find the common ratio.

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

$r = 5$

24) $-1, 6, -36, 216, ...$

$r = -6$

25) $-1, -5, -25, -125, ...$

$r = 5$

26) $-2, 10, -50, 250, ...$

$r = -5$

27) $-3, -1, -\dfrac{1}{3}, -\dfrac{1}{9}, ...$

$r = \dfrac{1}{3}$

28) $-2, \dfrac{1}{2}, -\dfrac{1}{8}, \dfrac{1}{32}, ...$

$r = -\dfrac{1}{4}$

Find the common ratio and the three terms in the sequence after the last one given.

29) −2, −8, −32, −128, ...

Common Ratio: $r = 4$
Next 3 terms: −512, −2048, −8192

30) 2, −8, 32, −128, ...

Common Ratio: $r = -4$
Next 3 terms: 512, −2048, 8192

31) 3, −6, 12, −24, ...

Common Ratio: $r = -2$
Next 3 terms: 48, −96, 192

32) 2, 10, 50, 250, ...

Common Ratio: $r = 5$
Next 3 terms: 1250, 6250, 31250

Find the common ratio and the recursive formula.

33) −1, 5, −25, 125, ...

Common Ratio: $r = -5$
Recursive: $a_n = a_{n-1} \cdot -5$
$\qquad a_1 = -1$

34) −3, −15, −75, −375, ...

Common Ratio: $r = 5$
Recursive: $a_n = a_{n-1} \cdot 5$
$\qquad a_1 = -3$

35) 3, −15, 75, −375, ...

Common Ratio: $r = -5$
Recursive: $a_n = a_{n-1} \cdot -5$
$\qquad a_1 = 3$

36) 0.5, 1, 2, 4, ...

Common Ratio: $r = 2$
Recursive: $a_n = a_{n-1} \cdot 2$
$\qquad a_1 = 0.5$

Find the common ratio, the term named in the problem, and the explicit formula.

37) 4, 12, 36, 108, ...
Find a_9

Common Ratio: $r = 3$
$a_9 = 26244$
Explicit: $a_n = 4 \cdot 3^{n-1}$

38) −2, 6, −18, 54, ...
Find a_{12}

Common Ratio: $r = -3$
$a_{12} = 354294$
Explicit: $a_n = -2 \cdot (-3)^{n-1}$

39) −3, 9, −27, 81, ...
Find a_{10}

Common Ratio: $r = -3$
$a_{10} = 59049$
Explicit: $a_n = -3 \cdot (-3)^{n-1}$

40) −4, 8, −16, 32, ...
Find a_{11}

Common Ratio: $r = -2$
$a_{11} = -4096$
Explicit: $a_n = -4 \cdot (-2)^{n-1}$

41) −4, −12, −36, −108, ...
Find a_{12}

Common Ratio: $r = 3$
$a_{12} = -708588$
Explicit: $a_n = -4 \cdot 3^{n-1}$

42) 4, 8, 16, 32, ...
Find a_{10}

Common Ratio: $r = 2$
$a_{10} = 2048$
Explicit: $a_n = 4 \cdot 2^{n-1}$

43) $-20, -10, -5, -\dfrac{5}{2}, \ldots$ Common Ratio: $r = \dfrac{1}{2}$

    Find a_9

$$a_9 = -\dfrac{5}{64}$$

Explicit: $a_n = -20 \cdot \left(\dfrac{1}{2}\right)^{n-1}$

44) $\dfrac{1}{2}, \dfrac{1}{6}, \dfrac{1}{18}, \dfrac{1}{54}, \ldots$ Common Ratio: $r = \dfrac{1}{3}$

    Find a_{12}

$$a_{12} = \dfrac{1}{354294}$$

Explicit: $a_n = \dfrac{1}{2} \cdot \left(\dfrac{1}{3}\right)^{n-1}$

Given the first term and the common difference of an arithmetic sequence find the explicit formula and the three terms in the sequence after the last one given.

45) $a_1 = 35, \ d = -20$

    Next 3 terms: 15, −5, −25
    Explicit: $a_n = 35 + (n-1) \cdot -20$

46) $a_1 = 22, \ d = -9$

    Next 3 terms: 13, 4, −5
    Explicit: $a_n = 22 + (n-1) \cdot -9$

47) $a_1 = -34, \ d = -2$

    Next 3 terms: −36, −38, −40
    Explicit: $a_n = -34 + (n-1) \cdot -2$

48) $a_1 = -22, \ d = -30$

    Next 3 terms: −52, −82, −112
    Explicit: $a_n = -22 + (n-1) \cdot -30$

Given the first term and the common ratio of a geometric sequence find the explicit formula and the three terms in the sequence after the last one given.

49) $a_1 = 4, \ r = -4$

    Next 3 terms: −16, 64, −256
    Explicit: $a_n = 4 \cdot (-4)^{n-1}$

50) $a_1 = -2, \ r = 4$

    Next 3 terms: −8, −32, −128
    Explicit: $a_n = -2 \cdot 4^{n-1}$

51) $a_1 = 1, \ r = 3$

    Next 3 terms: 3, 9, 27
    Explicit: $a_n = 3^{n-1}$

52) $a_1 = -3, \ r = -5$

    Next 3 terms: 15, −75, 375
    Explicit: $a_n = -3 \cdot (-5)^{n-1}$

Find the missing term or terms in each arithmetic sequence.

53) $\ldots, -6, \_\_\_, 8, \ldots$

    1

54) $\ldots, 30, \_\_\_, \_\_\_, 0, \ldots$

    20, 10

55) $\ldots, -14, \_\_\_, \_\_\_, 46, \ldots$

    6, 26

56) $\ldots, 38, \_\_\_, \_\_\_, 65, \ldots$

    47, 56