Name_____

Arithmetic Sequences and Series

Date_____ Period____

Determine if the sequence is arithmetic. If it is, find the common difference, the 52nd term, the explicit formula, and the three terms in the sequence after the last one given.

1) 13, 15, 17, 19, ...

2) 4, 7, 12, 19, ...

3) $2, \dfrac{5}{2}, 3, \dfrac{7}{2}, ...$

4) 34, 28, 22, 16, ...

Recursive

Explicit Formula

$$a_n = a_1 + d(n-1)$$

$$\boxed{a_{k+1} = a_k + d \qquad a_1 = }\kern-0.5em \swarrow$$

Next Term = Previous + d

Given the explicit formula for an arithmetic sequence find the common difference, the term named in the problem, and the recursive formula.

5) $a_n = 17 + 8n$

Find a_{39}

$\Big\}\, d = 8$

$a_n = 17 + 8n$

$a_{39} = 17 + 8(39)$

$$\boxed{a_{k+1} = a_k + 8 \qquad a_1 = 25}$$

6) $a_n = -\dfrac{5}{2} + \dfrac{3}{2}n$

Find a_{22}

Given two terms in an arithmetic sequence find the common difference, the explicit formula, and the recursive formula.

7) $a_{11} = 110$ and $a_{37} = 370$

8) $a_{10} = 14$ and $a_{37} = 122$

Find the missing terms in each arithmetic sequence.

9) $..., \dfrac{3}{2}, \underline{\quad}, \underline{\quad}, 0, ...$

10) $..., 3.4, \underline{\quad}, \underline{\quad}, -2, ...$

Evaluate the related series of each sequence.

11) 3.7, 4.6, 5.5, 6.4

12) 26, 36, 46, 56, 66, 76, 86

Sums

Evaluate each arithmetic series described.

⑬ $a_1 = \frac{3}{2}$, $d = \frac{1}{2}$, $n = 50$

$S_{50} = \frac{50}{2}\left(\frac{3}{2} + a_{50}\right)$

$\qquad\qquad\qquad a_n = \frac{3}{2} + \frac{1}{2}(n-1)$

14) $a_1 = -22$, $d = -3$, $n = 12$

15) $a_1 = 20$, $a_n = 55$, $n = 6$

$S_6 = \frac{6}{2}(20 + 55)$

16) $a_1 = 14$, $a_n = 86$, $n = 10$

17) $\sum_{m=1}^{10}\left(-2 + \frac{4}{3}m\right) \rightarrow -\frac{6}{3} + \frac{4}{3}m$

$S_{10} = \frac{10}{2}\left(-\frac{2}{3} + \frac{34}{3}\right) = \frac{320}{6}$

18) $\sum_{n=1}^{9}(7n - 17)$

19) $\sum_{m=1}^{35}(7m - 12)$

20) $\sum_{k=1}^{14}\left(-\frac{2}{3} + \frac{1}{2}k\right)$

21) $\sum_{i=2}^{⑩}(0.8i - 6.3)$

$S_9 = \frac{9}{2}(\qquad)$

22) $\sum_{n=4}^{53}(2n - 7)$

Determine the number of terms n in each arithmetic series.

23) $1 + (-2) + (-5) + (-8)...,\ S_n = -259$ 14 Terms

24) $18 + 21 + 24 + 27...,\ S_n = 468$

$S_n = \frac{n}{2}(a_1 + a_n) \qquad d = -3$

$\qquad\qquad\qquad\qquad -\frac{259}{-3} = 86\ \text{terms}$

1st term of
the given
series

$a_n = 1 - 3(n-1)$

$a_n = 1 - 3n + 3$

$\boxed{a_n = -3n + 4}$

$-259 = \frac{n}{2}(1 + a_n)$

$-259 = \frac{n}{2}(1 + -3n + 4)$

$\frac{14}{2}(1 + -38)$

$7(-37)$

$(2)\ -259 = \frac{n}{2}(-3n + 5)$

$-518 = n(-3n + 5)$

$-518 = -3n^2 + 5n$

$3n^2 - 5n - 518 = 0$

$\boxed{n = 14}$

Name_____

Arithmetic Sequences and Series

Date_____ Period____

Determine if the sequence is arithmetic. If it is, find the common difference, the 52nd term, the explicit formula, and the three terms in the sequence after the last one given.

1) 13, 15, 17, 19, ...

    Common Difference: $d = 2$
    Next 3 terms: 21, 23, 25
    $a_{52} = 115$
    Explicit: $a_n = 11 + 2n$

2) 4, 7, 12, 19, ...

    Not arithmetic

3) $2, \dfrac{5}{2}, 3, \dfrac{7}{2}, \ldots$ Common Difference: $d = \dfrac{1}{2}$

    Next 3 terms: $4, \dfrac{9}{2}, 5$

    $a_{52} = \dfrac{55}{2}$

    Explicit: $a_n = \dfrac{3}{2} + \dfrac{1}{2}n$

4) 34, 28, 22, 16, ...

    Common Difference: $d = -6$
    Next 3 terms: 10, 4, -2
    $a_{52} = -272$
    Explicit: $a_n = 40 - 6n$

Given the explicit formula for an arithmetic sequence find the common difference, the term named in the problem, and the recursive formula.

5) $a_n = 17 + 8n$
    Find a_{39}

    Common Difference: $d = 8$
    $a_{39} = 329$
    Recursive: $a_n = a_{n-1} + 8$
            $a_1 = 25$

6) $a_n = -\dfrac{5}{2} + \dfrac{3}{2}n$ Common Difference: $d = \dfrac{3}{2}$

    Find a_{22} $a_{22} = \dfrac{61}{2}$

    Recursive: $a_n = a_{n-1} + \dfrac{3}{2}$

                $a_1 = -1$

Given two terms in an arithmetic sequence find the common difference, the explicit formula, and the recursive formula.

7) $a_{11} = 110$ and $a_{37} = 370$

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

8) $a_{10} = 14$ and $a_{37} = 122$

    Common Difference: $d = 4$
    Explicit: $a_n = -26 + 4n$
    Recursive: $a_n = a_{n-1} + 4$
            $a_1 = -22$

Find the missing terms in each arithmetic sequence.

9) $\ldots, \dfrac{3}{2}, \underline{\quad}, \underline{\quad}, 0, \ldots$ $1, \dfrac{1}{2}$

10) $\ldots, 3.4, \underline{\quad}, \underline{\quad}, -2, \ldots$
    $1.6, -0.2$

Evaluate the related series of each sequence.

11) 3.7, 4.6, 5.5, 6.4

   20.2

12) 26, 36, 46, 56, 66, 76, 86

   392

Evaluate each arithmetic series described.

13) $a_1 = \dfrac{3}{2}$, $d = \dfrac{1}{2}$, $n = 50$

   $\dfrac{1375}{2}$

14) $a_1 = -22$, $d = -3$, $n = 12$

   -462

15) $a_1 = 20$, $a_n = 55$, $n = 6$

   225

16) $a_1 = 14$, $a_n = 86$, $n = 10$

   500

17) $\displaystyle\sum_{m=1}^{10}\left(-2 + \dfrac{4}{3}m\right)$

   $\dfrac{160}{3}$

18) $\displaystyle\sum_{n=1}^{9}(7n - 17)$

   162

19) $\displaystyle\sum_{m=1}^{35}(7m - 12)$

   3990

20) $\displaystyle\sum_{k=1}^{14}\left(-\dfrac{2}{3} + \dfrac{1}{2}k\right)$

   $\dfrac{259}{6}$

21) $\displaystyle\sum_{i=2}^{10}(0.8i - 6.3)$

   -13.5

22) $\displaystyle\sum_{n=4}^{53}(2n - 7)$

   2500

Determine the number of terms n in each arithmetic series.

23) $1 + (-2) + (-5) + (-8)...,\ S_n = -259$

   14

24) $18 + 21 + 24 + 27...,\ S_n = 468$

   13