Series and Sequences

Review Chapter 14 version 2 key Name_____

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

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

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

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

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) $a_n = -\frac{5}{2} + \frac{3}{2}n$ Common Difference: $d = \frac{3}{2}$
Find a_{22}

$a_{22} = \frac{61}{2}$

Recursive: $a_n = a_{n-1} + \frac{3}{2}$
$a_1 = -1$

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) ..., $\frac{3}{2}$, ___, ___, 0, ... 1, $\frac{1}{2}$

10) ..., 3.4, ___, ___, −2, ...
1.6, −0.2

Series and Sequences

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

$\frac{1375}{2}$

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

$\frac{160}{3}$

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

162

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

3990

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

$\frac{259}{6}$

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

−13.5

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

2500

Determine the number of terms *n* in each arithmetic series.

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

14

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

13

Series and Sequences

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Determine if the sequence is geometric. If it is, find the common ratio, the 8th term, and the explicit formula.

1) $-1,\ -3,\ -9,\ -27,\ \ldots$

Common Ratio: $r = 3$

$a_8 = -2187$

Explicit: $a_n = -3^{n-1}$

2) $2,\ \frac{1}{2},\ \frac{1}{8},\ \frac{1}{32},\ \ldots$ Common Ratio: $r = \frac{1}{4}$

$a_8 = \frac{1}{8192}$

Explicit: $a_n = 2 \cdot \left(\frac{1}{4}\right)^{n-1}$

3) $148,\ 1488,\ 14888,\ 148888,\ \ldots$

Not geometric

4) $0.75,\ 3,\ 12,\ 48,\ \ldots$

Common Ratio: $r = 4$

$a_8 = 12288$

Explicit: $a_n = 0.75 \cdot 4^{n-1}$

Given the explicit formula for a geometric sequence find the common ratio, the term named in the problem, and the recursive formula.

5) $a_n = -3 \cdot \left(\frac{1}{2}\right)^{n-1}$ Common Ratio: $r = \frac{1}{2}$

Find a_{11}

$a_{11} = -\frac{3}{1024}$

Recursive: $a_n = a_{n-1} \cdot \frac{1}{2}$

$a_1 = -3$

6) $a_n = -1.5 \cdot (-2)^{n-1}$

Find a_{10}

Common Ratio: $r = -2$

$a_{10} = 768$

Recursive: $a_n = a_{n-1} \cdot -2$

$a_1 = -1.5$

Given two terms in a geometric sequence find the common ratio, the explicit formula, and the recursive formula.

7) $a_4 = -\frac{1}{4}$ and $a_1 = 2$ Common Ratio: $r = -\frac{1}{2}$

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

Recursive: $a_n = a_{n-1} \cdot -\frac{1}{2}$

$a_1 = 2$

8) $a_5 = -24$ and $a_4 = -12$

Common Ratio: $r = 2$

Explicit: $a_n = -1.5 \cdot 2^{n-1}$

Recursive: $a_n = a_{n-1} \cdot 2$

$a_1 = -1.5$

Find the missing term or terms in each geometric sequence.

9) ..., 4, ___, ___, 108, ...

12, 36

10) ..., −25, ___, ___, ___, $-\frac{1}{25}$, ...

$-5,\ -1,\ -\frac{1}{5}$

Series and Sequences

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Evaluate each geometric series described.

11) $-3 + 15 - 75 + 375..., \ n = 8$

195312

12) $2 + 8 + 32 + 128..., \ n = 8$

43690

13) $a_1 = 1, \ r = 4, \ n = 7$

5461

14) $a_1 = 3, \ r = 2, \ n = 7$

381

15) $\sum_{k=1}^{8} -2 \cdot 6^{k-1}$

−671846

16) $\sum_{m=1}^{8} 32 \cdot \left(\frac{1}{2}\right)^{m-1}$

$\frac{255}{4}$

17) $\sum_{i=1}^{10} 0.2 \cdot 5^{i-1}$

488281.2

18) $\sum_{n=1}^{10} -2 \cdot 2^{n-1}$

−2046

Determine the number of terms *n* in each geometric series.

19) $\sum_{i=1}^{n} -4^{i-1} = -341$

5

20) $a_1 = -1, \ r = -5, \ S_n = 104$

4

Determine if each geometric series converges or diverges.

21) $-1 + 2 - 4 + 8...$

Diverges

22) $-16 - 4 - 1 - \frac{1}{4}...$

Converges

23) $\sum_{k=1}^{\infty} -3 \cdot \left(\frac{2}{5}\right)^{k-1}$

Converges

24) $\sum_{i=1}^{\infty} 2 \cdot 2^{i-1}$

Diverges

Evaluate each infinite geometric series described.

25) $\sum_{i=1}^{\infty} \left(\frac{1}{3}\right)^{i-1}$

$\frac{3}{2}$

26) $\sum_{i=1}^{\infty} 0.4 \cdot 0.9^{i-1}$

4

27) $\sum_{m=1}^{\infty} \left(-\frac{2}{3}\right)^{m-1}$ $\frac{3}{5}$

28) $\sum_{k=1}^{\infty} -4^{k-1}$

No sum