

Practice 06

- 12.1 Sequences and Series
- 12.2 Arithmetic Sequences and Series
- 12.3 Geometric Sequences and Series
- 12.4 Mathematical Induction
- 12.5 The Binomial Theorem

The n th term of a sequence is given. Write the first four terms of the sequence.

1) $a_n = 9n - 7$ 1) _____
A) 2, 11, 20, 29 B) -2, -11, -20, -29

The n th term of a sequence is given. Find the indicated term.

2) $a_n = 2^n + 9$; a_6 2) _____
A) 21 B) 576 C) 108 D) 73

Write the first five terms of the sequence defined recursively.

3) $b_1 = 5$; $b_n = 5b_{n-1} - 3$ 3) _____
A) $b_1 = 5, b_2 = 22, b_3 = 107, b_4 = 532, b_5 = 2,657$
B) $b_1 = 5, b_2 = 10, b_3 = 15, b_4 = 20, b_5 = 25$

The n th term of a sequence is given. Find the indicated term.

4) $a_n = \frac{2^n}{(n+1)!}$; a_4 4) _____
A) $\frac{1}{15}$ B) $\frac{16}{5}$ C) 2 D) $\frac{2}{15}$

Find the sum.

5) $\sum_{i=1}^4 (5i + 1)$ 5) _____
A) 33 B) 54 C) 27 D) 21

Write the first four terms of an arithmetic sequence, $\{a_n\}$, based on the given information about the sequence.

6) $a_1 = 3, d = 6$ 6) _____
A) 18, 108, 648, 3,888 B) 3, 9, 15, 21
C) 3, 18, 108, 648 D) 9, 15, 21, 27

Find the indicated term of the arithmetic sequence based on the given information.

- 7) $a_1 = 38, d = 3$; Find a_{25} . 7) _____
A) 110 B) 107 C) 104 D) 113

Write a nonrecursive formula for the n th term of the arithmetic sequence $\{a_n\}$ based on the given information.

- 8) $a_1 = 6, d = 4$ 8) _____
A) $a_n = 4n + 2$ B) $a_n = 4n - 2$ C) $a_n = 2n + 4$ D) $a_n = 2n - 4$

Find the number of terms of the finite arithmetic sequence.

- 9) 12, 21, 30, 39, ..., 525 9) _____
A) 58 B) 60 C) 57 D) 59

From the given terms of the arithmetic sequence, find a_1 and d .

- 10) $a_{12} = 50$ and $a_{25} = 89$ 10) _____
A) $a_1 = 17, d = 3$ B) $a_1 = 2, d = 4$
C) $a_1 = 20, d = 3$ D) $a_1 = 14, d = 3$

Find the sum.

- 11) $3 + 4.6 + 6.2 + 7.8 + \dots + 55.8$ 11) _____
A) 1,002.8 B) 387 C) 999.6 D) 77.4

Determine whether the sequence is geometric. If so, find the value of r .

- 12) 2, -6, 18, -54, ... 12) _____
A) not geometric B) geometric; $r = -3$

Write the first four terms of a geometric sequence, $\{a_n\}$, based on the given information about the sequence.

- 13) $a_1 = -5, r = -4$ 13) _____
A) -5, 20, -80, 320, ... B) -9, -13, -17, -21, ...

Write a formula for the n th term of the geometric sequence.

- 14) 1,000, 200, 40, 8, ... 14) _____
A) $a_n = 1,000\left(\frac{1}{5}\right)^{n-1}$ B) $a_n = 1,000\left(\frac{1}{5}\right)^n$

Find the indicated term of a geometric sequence from the given information.

- 15) $a_1 = 3$ and $a_4 = 81$. Find a_{10} . 15) _____
A) 59,049 B) 705 C) 177,147 D) 783

Find the sum of the geometric series, if possible.

- 16) $\sum_{n=1}^7 6\left(\frac{2}{3}\right)^{n-1}$ 16) _____
A) 18 B) 28 C) $\frac{4118}{243}$ D) 35

- 17) $\sum_{n=1}^{\infty} \left(-\frac{1}{2}\right)^n$ 17) _____
A) $-\frac{1}{3}$ B) $\frac{2}{3}$ C) - 1 D) 2

Write the given rational number as the quotient of two integers in simplest form.

- 18) $0.\overline{77}$ 18) _____
A) $\frac{77}{999}$ B) $\frac{7}{9}$ C) $\frac{77}{1000}$ D) $\frac{77}{100}$

Use mathematical induction to prove the given statement for all positive integers n .

- 19) $3 + 7 + 11 + \dots + (4n - 1) = n(2n + 1)$ 19) _____

Solve the problem.

- 20) Suppose you wish to prove the statement that follows using mathematical induction. 20) _____

$$4 + 9 + 14 + \dots + (5n - 1) = \frac{n}{2}(5n + 3), \text{ for all positive integers } n. \text{ Let } S_n \text{ be the}$$

statement $4 + 9 + 14 + \dots + (5n - 1) = \frac{n}{2}(5n + 3)$. Show that S_1 is true.

- A) Since $\frac{1}{2}(5(1) + 3) = \frac{1}{2}(8) = 4$, S_1 is true.
B) Not true.

Expand the binomial by using the binomial theorem.

21) $(5 + y)^4$

A) $625 + y^4$

B) $625 + 500y + 150y^2 + 20y^3 + y^4$

21) _____

22) $(3 - y^3)^5$

A) $[3 + (-y^3)]^5$

B) $[3 + (-y^3)]^5 = 243 - 405y^3 + 270y^6 - 90y^9 + 15y^{12} - y^{15}$

22) _____

Find the indicated term of the binomial expansion.

23) $(x - y)^{11}$; sixth term

A) $-462x^6y^5$

B) $462x^5y^6$

C) $-462x^5y^6$

D) $462x^6y^5$

23) _____

Answer Key

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- 1) A
- 2) D
- 3) A
- 4) D
- 5) B
- 6) B
- 7) A
- 8) A
- 9) A
- 10) A
- 11) C
- 12) B
- 13) A
- 14) A
- 15) A
- 16) C
- 17) A
- 18) B
- 19) Proofs will vary.
- 20) A
- 21) B
- 22) B
- 23) A