

## Sequences and Series Quiz Answer Key PDF

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**What is the common difference in the arithmetic sequence 3, 7, 11, 15, ...?**

- A. 2
- C. 4 ✓**
- D. 5
- C. 3

**Which of the following is a geometric sequence?**

- A. 2, 4, 6, 8, ...
- C. 5, 10, 15, 20, ...
- D. 1, 3, 5, 7, ...
- C. 3, 6, 12, 24, ... ✓**

**Explain the difference between a sequence and a series.**

**A sequence is an ordered list of numbers, while a series is the sum of the terms of a sequence.**

**Which sequences are considered divergent?**

- A.  $\sum_{n=1}^{\infty} \frac{1}{n}$  ✓**
- C.  $\sum_{n=1}^{\infty} \frac{1}{n^2}$
- D.  $\sum_{n=1}^{\infty} n$  ✓**
- C.  $\sum_{n=1}^{\infty} \frac{1}{2^n}$

**Describe how you would determine if an infinite series converges or diverges.**

Use convergence tests such as the Ratio Test, Root Test, or Integral Test to analyze the behavior of the series as the number of terms approaches infinity.

Which sequence is defined by the recursive formula  $a_n = a_{n-1} + a_{n-2}$  with initial terms 0 and 1?

- A. Arithmetic Sequence
- C. Harmonic Sequence
- D. Fibonacci Sequence ✓**
- C. Geometric Sequence

Which series is divergent?

- A.  $\sum_{n=1}^{\infty} \frac{1}{n^2}$
- C.  $\sum_{n=1}^{\infty} \frac{1}{2^n}$
- D.  $\sum_{n=1}^{\infty} \frac{1}{n^3}$
- C.  $\sum_{n=1}^{\infty} \frac{1}{n}$  ✓**

What is the formula for the nth term of an arithmetic sequence?

- A.  $a_n = a_1 * r^{(n-1)}$
- C.  $a_n = a_1 * n$
- D.  $a_n = a_1 + n$
- C.  $a_n = a_1 + (n-1) * d$  ✓**

What is the sum of the infinite geometric series with first term 5 and common ratio 0.5?

- A. 10 ✓**
- C. 20
- D. 25
- C. 15

Which of the following are properties of an arithmetic sequence?

- A. Constant difference between terms ✓**
- C. Linear growth ✓**
- D. Constant ratio between terms

C. Exponential growth

**What is the sum of the first 5 terms of the arithmetic sequence 2, 5, 8, 11, ...?**

A. 25

**C. 35 ✓**

D. 40

C. 30

**Which of the following are characteristics of a geometric sequence?**

**A. The ratio between consecutive terms is constant ✓**

**C. It can be finite or infinite ✓**

D. The difference between consecutive terms is constant

C. It always converges

**Provide an example of a real-world application of geometric sequences.**

**Geometric sequences are used in calculating compound interest in finance, where the amount of money grows by a constant percentage over time.**

**Explain the significance of the Fibonacci sequence in nature.**

**The Fibonacci sequence appears in various natural phenomena, such as the arrangement of leaves on a stem, the branching of trees, and the pattern of seeds in a sunflower.**

**How does the concept of convergence apply to infinite series in mathematics?**

**Convergence in infinite series means that as more terms are added, the series approaches a specific finite value, indicating stability in the sum.**

**Describe a scenario where an arithmetic sequence might be used in everyday life.**

**For example, if someone decides to save \$100 each month, their total savings after 1 month would be \$100, after 2 months it would be \$200, after 3 months it would be \$300, and so on, forming an arithmetic sequence with a common difference of \$100.**

**Which tests can be used to determine the convergence of a series?**

- A. Ratio Test ✓**
- C. Root Test ✓**
- D. Difference Test
- C. Integral Test ✓**

**Which of the following statements about infinite series are true?**

- A. All infinite series converge
- C. An infinite geometric series converges if the common ratio is less than 1 ✓**
- D. An infinite arithmetic series always diverges ✓**
- C. The sum of an infinite series can be finite ✓**

**Which of the following are examples of special series?**

- A. Arithmetic Series ✓**
- C. Harmonic Series ✓**
- D. Telescoping Series ✓**
- C. Exponential Series ✓**

**In a geometric sequence, if the first term is 2 and the common ratio is 3, what is the fourth term?**

- A. 18
- C. 54 ✓**
- D. 81
- C. 24