

Name: \_\_\_\_\_

Block: \_\_\_\_\_

Practice.  
No need to submit.

Test: Unit 2  
Sequences, Series  
Group A.

There are **15 questions** in this quiz, each worth **4pts**.

You have **40 minutes** to complete the test (more if you have accommodations).

(Note: The test will be weighted on Gradebook as 50 points, compared to quizzes which are usually between 10 to 15 points).

===== Start of test

1. For an arithmetic sequence  $A$ , we know that  $a_{11} = -22$  and  $a_5 = -10$ . Find  $a_{31} = ?$ .

2. Find the explicit formula for a geometric sequence with  $g_3 = 15$  and  $r = 3$ .

3. Find the sum

$$3 + 8 + 13 + \cdots + 53 = ?$$

4. Find the sum

$$\sum_{i=1}^{32} (i + 4(2 - i)) = ?$$

5. Find the sum

$$\sum_{k=1}^{\infty} 3^{-k} = ?$$

6. Find the sum

$$\sum_{k=1}^3 \left( \frac{k}{3} + 3^k \right) = ?$$

7. The sum of the first 11 elements of an arithmetic sequence is 100. The 11<sup>th</sup> element of the sequence is 20. Find the first element and the common difference of the sequence.

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Let  $A = \{a_1, a_2, a_3, \dots\}$  and  $B = \{b_1, b_2, b_3, \dots\}$  denote two arithmetic sequences. These will be used in the following 4 questions.

8. Is the sequence  $C = \{(a_1 + b_1), (a_1 + b_2), (a_1 + b_3), \dots\}$  an arithmetic sequence? Justify your answer.
  
  
  
  
  
  
  
  
  
  
9. Is the sequence  $D = \{(a_1 + b_1), (a_2 + b_2), (a_3 + b_3), \dots\}$  an arithmetic sequence? Justify your answer.
  
  
  
  
  
  
  
  
  
  
10. Is the sequence  $E = \{b_1 \cdot a_1, b_1 \cdot a_2, b_1 \cdot a_3, \dots\}$  an arithmetic sequence, a geometric sequence, or neither? Justify your answer.
  
  
  
  
  
  
  
  
  
  
11. Find the sum of the first 8-terms of the sequence  $\{5b_1, 5b_2, 5b_3, \dots\}$  in terms of  $b_1$  and  $b_2$  only?

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12. Find the sum of the first  $N$  even numbers in terms of  $N$ .

13. Given the explicit formula  $a_n = 3 \cdot 2^n + n \cdot 4$ , find the sum of the first 5 elements ( $a_1$  through  $a_5$ ). Explain your work.

14. Given the recursive formula  $a_{n+2} = a_n + 2 \cdot a_{n+1}$ , and the two values  $a_1 = 3$  and  $a_3 = 3$ , find  $a_4$ . Explain your work.

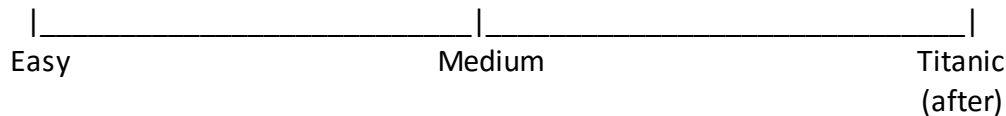
15. Calculate the following sum

$$\sum_{n=1}^{99} \left( \frac{1}{n} - \frac{1}{n+1} \right)$$

(Side note: This is BEYOND the scope of this Test, but just to note, the sum we calculate above is equivalent to the more famous series  $\sum_{n=1}^{99} \left( \frac{1}{n(n+1)} \right)$ , which can be simplified using the observation  $\frac{1}{n(n+1)} = \frac{1}{n} - \frac{1}{n+1}$  ).

===== Feedback =====

How would you rate the level of difficulty of this test?  
(put a mark somewhere on the scale)



Did you feel well prepared?



===== End of test