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

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

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^{th} 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)

|____________________________|______________________________|

Easy Medium Titanic (after)

Did you feel well prepared?

|____________________________|______________________________|

Did you teach this? Somewhat Perfect

===== End of test