

Litmus Test For Math 20-1 Sequence and Series

1. If the sum of the first 16 terms of an arithmetic sequence is 40 and the common difference is 5, then the first term in this series is
A) -9 B) -27 C) -35 D) -72

2. In an arithmetic sequence, the fourth term is 0 and the thirteenth term is 27. The value of d , the common difference is ____.

3. The first term of a geometric series is 160 and the common ratio is 1.5. If the sum of the series is 2110, then the number of terms is
A) 4 B) 5 C) 6 D) 7

4. In a geometric sequence, $t_1 = 17$ and $t_6 = 4131$. The common ratio for this sequence is ____.

5. Given the geometric sequence, $-\frac{75}{32}, \frac{15}{8}, -\frac{3}{2}, \frac{6}{5}, \dots$, the value of the common ratio can be written in the form, $-\frac{m}{k}$ where m and k are integers. The values of m and k , respectively, are
A) 5 and 9 B) 4 and 5 C) 5 and 2 D) 4 and 9

Use the following information to answer the next question.

The following statements are made regarding the infinite geometric series, $3 + 3\left(\frac{5}{4}\right) + 3\left(\frac{5}{4}\right)^2 + 3\left(\frac{5}{4}\right)^3 + \dots$

Statement 1	The sum is 12.
Statement 2	$-1 < r < 1$
Statement 3	$t_1 = \frac{5}{4}$.
Statement 4	This series is divergent.

6. The correct statement is

- A) 1 B) 2 C) 3 D) 4

7. The number of terms in the arithmetic sequence, $6, \frac{19}{3}, \frac{20}{3}, \dots, 40$, is

- A) 102 B) 103 C) 104 D) 105

8. The sum of an infinite geometric series is $\frac{80}{3}$. If $r = \frac{1}{4}$, then the value of t_1 is _____.

9. The first 3 terms of a geometric sequence are $x, x + 7, 4x, \dots$. Which statement below is correct?

- A) The common ratio is 2 and the 4th term is 56.
B) The common ratio is 2 and the 4th term is 28.
C) The common ratio is 3 and the 4th term is 56.
D) The common ratio is 3 and the 4th term is 28.

10. The sum of the sequence, $-9, -1, 7, \dots, 135$ can be written in the form $ABCD$, where each of the 4 letters represents an integer. The values of $A, B, C,$ and $D,$ respectively, are ____, ____, ____, and ____.
11. If the sum of 6 terms of a geometric series is 189 and the common ratio is 2, then t_8 is
A) 192 B) 384 C) 768 D) 1536
12. The 5th term of a geometric sequence is 72 and the 9th term is 93 312. The 2nd term of this sequence is
A) $\frac{1}{18}$ B) $\frac{1}{6}$ C) $\frac{1}{3}$ D) 2
13. Tony begins a savings plan by saving \$1 during the first week. In each subsequent week, he saves \$3 more than the week before. At the end of the 20th week, the total amount he has saved is
A) \$58 B) \$580 C) \$590 D) \$1160
14. Suppose your aunt and uncle receive yearly payments from an annuity. On each yearly anniversary, they receive 90% of the preceding years amount. If the first payment is \$6350, how much in all (to the nearest dollar) will be paid out in 8 years?
A) 32 540 B) 36 165 C) 38 890 D) 42 397

Written Response

- Write your responses as neatly as possible.
- For full marks, your responses must address **all** aspects of the question.
- All responses, including descriptions and/or explanations of concepts must include pertinent ideas, calculations, formulas and correct units.
- Your responses must be presented in a in a well-organized manner. For example, you may organize your responses in point form or paragraphs.

WRITTEN RESPONSE 1

Tom was asked to find the general term for the geometric sequence, $8r^3, 16r^4, 32r^5, \dots$

His work is shown below.

Step 1	$\frac{16r^4}{8r^3} = 2r$
Step 2	$t_n = 8r^3(2r)^{n-1}$
Step 3	$t_n = (2r)^3(2r)^{n-1}$
Step 4	$t_n = (2r)^{3n-3}$

- **Analyze** his work and **describe** the error made by Tom. [2 Marks]

- Make the correction. **Explain.** [1 Mark]

- **Determine** the coefficient of t_8 . [1 Mark]

WRITTEN RESPONSE 2

Domestic bees make their honeycomb by starting with a single hexagonal cell, then forming ring after ring of hexagonal cells around the initial cell. The number of cells in successive rings form an arithmetic sequence.

- Write a rule for the number of cells in the n th ring. **Justify**. [2 Marks]

- **Algebraically determine** the total number of cells in the honeycomb after the 11th ring has formed. (do not forget to count the initial cell) [1 Mark]

- If the total number of cells is 816, **determine** the number of rings that have been formed. **Sketch** a graph and **explain** how it pertains to the answer. [2 Marks]