

MATHCOUNTS[®] Problem of the Week Archive

In Sequence – February 13, 2023

Problems & Solutions

What is the 20th term of the arithmetic sequence 13, 19, 25, 31, ...?

*The common difference is $19 - 13 = 6$. Now that we know that, we can find the 20th term by $13 + 6(20 - 1)$. Thus, the 20th term is **127**.*

What is the sum of A and B in the arithmetic sequence 7, 15, 23, A, 39, B, ...?

The common difference is $15 - 7 = 8$. Therefore, A is $23 + 8 = 31$ and B is $39 + 8 = 47$. The sum $A + B$ is $31 + 47 = \mathbf{78}$.

What is the sum of A and B from the geometric sequence 32, A, 72, B, 162, 243...?

In a geometric sequence, any term after the first is equal to the geometric mean of the term immediately preceding it and the term immediately following it. This means that $32/A = A/72 \rightarrow A^2 = 2304 \rightarrow A = 48$. Additionally, $72/B = B/162 \rightarrow B^2 = 11,664 \rightarrow B = 108$. So, the sum $A + B$ is $48 + 108 = \mathbf{156}$.

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