

11U U7: Sequences and Series Happy Fun-Times Problems

Formulas:

Arithmetic Sequences

Recursive: $t_1 = a, t_n = t_{n-1} + d$

General Term $t_n = a + (n-1)d$

Geometric Sequences

Recursive: $t_1 = a, t_n = r \cdot t_{n-1}$

General Term: $t_n = a \cdot r^{n-1}$

Arithmetic Series

General: $S_n = \frac{n(2a + (n-1)d)}{2}$

Know Last Term: $S_n = \frac{n(t_1 + t_n)}{2}$

Geometric Series

General: $S = \frac{a(r^n - 1)}{(r - 1)}$

Know Last Term: $S_n = \frac{t_{n+1} - t_n}{(r - 1)}$

Practice writing clear and well written solutions using the following problems. Also - help each other learn.

1. Find the general term of the sequence: 7, 13, 19, 25, 31, ...and find t_{50} . Smile - you're doing math!
2. The 3rd term of an arithmetic sequence is 7, and the 7th term is 23. Determine t_{20} and make someone's day a little brighter.
3. Determine the number of terms in the arithmetic sequence: $-45, -32, -19, -6, \dots, 124$. Did you hear about the constipated accountant? She couldn't budget. Did you hear about the constipated mathematician? He worked it out with a pencil - at least he didn't use a calculator to work it out...

4. A music hall has 27 seats in the first row, 34 in the second row, 41 seats in row 3, and so on. The pattern continues in the rows of seats. The last row has 181 seats. There is an amazing vending machine in the lobby dispensing the most delicious foods you can think of like spaghetti and meatballs dinner and lemon meringue pie. Yum.
- How many seats are in the tenth row of the hall?
 - How many seats are there in the hall?
5. Write the general term of the geometric sequence: 4, -8, 16, -32, ... and find t_7 . Encourage your neighbor with a thoughtful compliment. Be nice to each other.
6. Given a sequence with $t_1 = -34$ and a common difference between terms of $d = +13$, determine the sum of the first 250 terms. Doing so will make you a better human being. You are welcome.
7. Tell your neighbor(s) a good joke, and then calculate the sum of the arithmetic series: $-396 - 308 - 220 - 132 - \dots + 836$.

