Blank Blank Blank : Every Question!!!

$\underline{\quad}_{t_1}, \underline{\quad}_{t_2}, \underline{\quad}_{t_3} \cdots \underline{\quad}_{t_n} \cdots \underline{\quad}_{t_{n^*}}$

C11 - 1.0 - Sequences/Series Review

Arithmetic

$+d=3$ $\quad +d=3$ $\quad$ [+]

t_1	t_2	t_3		t_{11}		t_n
2	5	8	...	32	...	?
$n=1$	$n=2$	$n=3$		$n=11$		$n=n$

n	t
1	2
2	5
3	8

$t_1 =$ 1st term (aka: "a or u_1")
d = common difference
r = common ratio
$t_n =$ term n, every term
n = Term #, or # of terms
$S_n =$ sum of n terms
$t_{n\pm1}$ = term after/before t_n

$t_{n\pm m}$: m Terms After/Before t_n

$\underset{t_1}{t_1}, \underset{t_2}{t_1+d}, \underset{t_3}{t_1+2d} \cdots \underset{t_n}{t_1+(n-1)d}$

$t_n = t_1 + (n-1)d$ General Term Formula

$d = t_n - t_{n-1}$

$t_n = t_m + (n-m)d$ *Logic

$s_n = \frac{n}{2}(t_1 + t_n)$ If "n" and t_n is known.

Find "d" twice*

Check Answer 2,5,8,11,14,17... ✓

$s_n = \frac{n}{2}(2t_1 + (n-1)d)$ If n and d is known.

$t_n = s_n - s_{n-1}$

$\frac{t_1 + t_n}{2}$ = middle term

Remember!!!

Substitute in for n on left side of equation,
Substitute in for n on right side of equation!

Geometric

$\times r = 3$ $\quad \times r = 3$ $\quad$ [×]

t_1	t_2	t_3		t_{11}		t_n
2	6	18	...	468	...	?

n	t
1	2
2	6
3	18

$\underset{t_1}{t_1}, \underset{t_2}{t_1 r}, \underset{t_3}{t_1 r^2} \cdots \underset{t_n}{t_1 r^{n-1}}$

$t_n = t_1 r^{n-1}$ General Term Formula

$r = \frac{t_n}{t_{n-1}}$

$r^{m-n} = \frac{t_m}{t_n}$ *Logic

$s_n = \frac{t_1 - r t_n}{1-r}$ If t_n is known.

Find "r" twice*

$t_n = t_m r^{n-m}$

$m > n$

$s_n = \frac{t_1(1-r^n)}{1-r}$ If n is known.

Check Answer 2,6,18,54,162,468... ✓

Patterns Not Arithmetic or Geometric

1,1,2,3,5 *Fibonacci*
1,1 then Add two previous numbers

$t = n^2 + 1$ *Quadratics*

n	t
1	2
2	5
3	10

Etc...

Infinite Geometric

$s_\infty = \frac{t_1}{1-r}$

$r = 2$

$r \geq 1$
$r \leq -1$
OR
$|r| \geq 1$

∴ Divergent ∴ (No sum)

$1 + 2 + 4 + \cdots \infty^* = \infty^*$

OR

$s_\infty = \frac{t_1}{1-r}$

$s_\infty = \frac{8}{1-\frac{1}{2}} = 16$

$-1 < r < 1$
OR
$|r| < 1$

∴ Convergent ∴ (Has sum)

$r = \frac{1}{2}$

$8 + 4 + 2 + 1 + \frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \frac{1}{16} + \cdots + \frac{1}{\infty^*} = 15.999\ldots = 16^*$

Σ = Sigma (Sum terms)

(Last term of k)

# of terms = $n - k + 1$

$$S_n = \sum_{k=1}^{n} a_k$$

Formula to substitute k into

(first term of k)

Index: What k starts at. Goes up by 1 each time to reach n.