5

AP/GP

Second term of a GP is 1000 and the common ratio is $r = \frac{1}{n}$ where n is a natural number. P_n is the product of n terms of this GP. $P_6 > P_5$ and $P_6 > P_7$, what is the sum of all possible values of n?

Let the nth term of AP be defined as t_n , and sum up to 'n' terms be defined as S_n . If $|t_8| = |t_{16}|$ and t_3 is not equal to t_7 , what is S_{23} ? ١

$$t_{1} = a \quad cd = d$$

$$t_{2} = a + 7d \quad t_{16} = a + 15di \quad t_{3} = a + 2d \quad t_{7} = a + 6d$$

$$-\left(a - \frac{\pi}{11}\right) = a - \frac{15}{11} \quad t_{3} = \frac{\pi}{14} + \frac{\pi}{2} \quad a + 2d \neq a + 6d$$

$$-\left(a - \frac{\pi}{11}\right) = a - \frac{15}{11} \quad d \neq 0 \qquad S_{23} = \frac{23}{2} \left[2a + 22d\right]$$

$$-a + \frac{\pi}{11} = a - \frac{15}{11} \quad |a + 7d|^{2} = |a + 15d|^{2}$$

$$-a + \frac{\pi}{11} = a - \frac{15}{11} \quad |a + 7d|^{2} = a^{2} + 30d + 225d^{2}. \qquad = 23(a + 11d)$$

$$2a = \frac{22}{11} = 2 \qquad 176d^{2} = -16d \qquad = 23(a - 1)$$

$$a^{2} + 14d + 49d^{2} = a^{2} + 30d + 225d^{2}. \qquad = 23(a - 1)$$

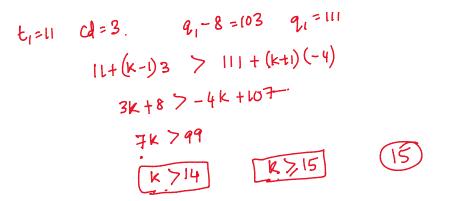
$$a^{2} + 14d + 49d^{2} = -16d \qquad = 0$$

Consider a, b, c in a G.P. such that |a + b + c| = 15. The median of these three terms is a, and b = 10. If a > c, what is the product of the first 4 terms of this G.P.?

Sequence P is defined by $p_n = p_{n-1} + 3$, $p_1 = 11$, Sequence Q is defined as $q_n = q_{n-1} - 4$, $q_3 = 103$. If $p_k > q_{k+2}$, what is the smallest value k can take?

$$t_1 = b_1 \quad cd = 3 \quad t_1 = q_1 \quad cd = -4$$

 $t_1 = 11 \quad cd = 3 \quad q_1 = 8 = (03 \quad q_1 = 111)$



a, b, c and d are in A.P., What can we say about terms bcd, acd, abd and abc?

A. They are also in A.P.
B. They are also in H.P.
C. They are also in G.P.
D. They are not in an A.P., G.P. or H.P.

$$\frac{1}{bcd} - \frac{1}{acd} + \frac{1}{abd} + \frac{1}{abc}$$

$$\frac{1}{bcd} - \frac{1}{acd} + \frac{1}{abd} + \frac{1}{abc}$$

$$\frac{1}{abc} + \frac{1}{abc} + \frac{1}{abc}$$

$$\frac{1}{abc} + \frac{1}{abc} + \frac{1}{abc} + \frac{1}{abc}$$

$$\frac{1}{abc} + \frac{1}{abc} + \frac{1}$$

If $S_n = n^3 + n^2 + n + 1$, where S_n denotes the sum of the first n terms of a series and $t_m = 291$, then m is equal to?

$$S_{n} = n^{3} + n^{2} + n + 1$$

$$S_{n-1} = (n-1)^{3} + (n-1)^{2} + (n-1) + 1$$

$$t_{n} = S_{n} - S_{n-1} = \left[n^{3} - (n-1)^{3}\right] + \left[n^{2} - (n-1)^{2}\right] + \left[n - (n-1)^{2}\right]$$

$$z = \left[n^{2} + n(n-1) + (n-1)^{2}\right] + (2n-1) + 1$$

$$= \left[n^{2} + n^{2} - n + n^{2} - 2n + 1\right] + 2n$$

$$t_{n} = 3n^{2} - n + 1$$

$$3m^{2} - m + 1 = 291$$

$$m = L \pm \sqrt{1 + 3480} = 1 \pm 59$$

$$m = 10$$

Let $\{a_n\}$ be a non-constant arithmetic progression. $a_1 = 1$ and the following holds true: for any $n \ge 1$, the value of $\frac{a_{2n} + a_{2n-1} + \ldots + a_{n+1}}{a_n + a_{n-1} + \ldots + a_1}$ remains constant does not depend on n). Find a_{15}

$$\frac{A_{2n} + A_{2n-1} + \dots + A_{n+1}}{A_n + a_{n-1} + \dots + a_1} = C (constant)$$

$$\frac{A_{2n} + A_{2n-1} + \dots + A_1}{A_n + a_{n-1} + \dots + a_1} = C (constant)$$

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

$$\frac{1}{2} \lfloor 2a_{1} + (n-1)d \rfloor$$
Since C is constant i.e. $\frac{(+)}{2}$ is combant

$$\frac{1}{2} \left(2a_{1} + (n-1)d \right)$$
Since $a_{1} = 1$

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