

الف) $t_n = 2^{n-2} \Rightarrow t_{10} = 2^{10-2} = 2^8 = 256$ ✓

ب) $q^{n-m} = \frac{a_n}{a_m} \Rightarrow \frac{a_{14}}{a_{12}} = q^{14-12} = q^2 \Rightarrow 2^2 = 4$ ✓

ج) $q^{10-2} = q^8 \Rightarrow \sqrt{q^8} = q^4 = 1 \Rightarrow 2^4 = 16$ ✓
 $t_2 = 2^{2-2} = 2^0 = 1$

د) $t_n = 121 \Rightarrow 2^{n-2} = 121 \Rightarrow 2^{n-2} = 2^6 \Rightarrow n-2 = 6 \Rightarrow n = 8$ ✓

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$q^{n-m} = \frac{a_n}{a_m} \Rightarrow q^{14-12} = \frac{96}{12} \Rightarrow q^2 = 8 \Rightarrow q = 2$

$a q^4 = a_8 \Rightarrow a_{10} = a q^4 = a q^2 \times q^2 = a_8 \times q^2 = 96 \times 2^2 = 96 \times 4 = 384$ ✓

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الف) $b^2 = ac \Rightarrow a_1 \times a_4 = a_3^2 \Rightarrow a_1 \times a_2 \times a_3 \times a_4 = 2^2 \times 2^2 \Rightarrow a_3^2 = 2^4 \Rightarrow a_3 = 2^2 = 4$ ✓

ب) $b^2 = ac \Rightarrow a_1 \times a_4 = a_3^2 = 2^2 = 4$ ✓

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$b^2 = ac \Rightarrow 2^b \times 2^a = (2^{\sqrt{2}})^2 \Rightarrow 2^{a+b} = 2^2 = 2^{\sqrt{2}} \Rightarrow a+b = \sqrt{2}$

$2^{\sqrt{2}} = 2^{1/\sqrt{2}} \Rightarrow b, 2/\sqrt{2}, a \Rightarrow b, 2/\sqrt{2}, a = 2/\sqrt{2}$ ✓

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$b^2 = ac \Rightarrow (1-x)(x+1) = x^2 \Rightarrow x^2 = 1-x^2 \Rightarrow x^2 + x^2 = 1 \Rightarrow 2x^2 = 1 \Rightarrow x^2 = \frac{1}{2} \Rightarrow x = \pm \frac{1}{\sqrt{2}}$

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نقطه حالت + قابل قبول است زیرا به انای $x = \pm \frac{1}{\sqrt{2}}$ جملات فرد با هم غیر هم علامت می شوند.

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$$\left. \begin{aligned} a_1 + a_r &= a_1 + a_1 q^r = 2\Lambda \\ a_r + a_r &= a_1 q + a_1 q^r = 12 \end{aligned} \right\} \Rightarrow a_1 + a_r + a_r + a_r = a_1 + a_1 q + a_1 q^r + a_1 q^r = 20 \Rightarrow a_1(1 + q + q^r + q^r) = 20$$

$$a_r + a_r = a_1 q + a_1 q^r = 12$$

$$1, r, q, 2V \Rightarrow \boxed{2V}$$

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$$a \times a q \times a q^r = a^r q^r = 2V = r^r \begin{cases} a=1, r^r = 2V \Rightarrow q=r \rightarrow \boxed{1, r, q} \rightarrow 1+r+q=13 \checkmark \\ q=1, a^r = 2V \Rightarrow a=r \rightarrow r, r, r \rightarrow r+r+r=9 \times \end{cases}$$

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$$\begin{cases} q = r \\ q = \frac{1}{r} \end{cases} \xrightarrow{a=r} \begin{cases} q = r \rightarrow 1, r, q \\ q = \frac{1}{r} \rightarrow q, r, 1 \end{cases}$$

$$\text{ا) } S_n = a_1 \left(\frac{q^n - 1}{q - 1} \right) \Rightarrow S_6 = 2 \left(\frac{r^6 - 1}{r - 1} \right) = 2 \times \frac{r^6 - 1}{r - 1} = \boxed{r^6 - 1 = 2048}$$

$$\text{ب) } a \times a q \times a q^r \times \dots \times a q^5 = a^{10} \times q^{15} = \boxed{r^{10} \times r^{15}}$$

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$$a, a q, a q^r, a q^r, \dots \rightarrow a q - a = a(q-1), a q^r - a q = a q(q-1), a q^r(q-1), \dots$$

$$b^r = a c \Rightarrow (a q)^r = a q^r \Rightarrow a^r q^r = a^r q^r \checkmark$$

$$a, a q, a q^r, \dots \rightarrow \text{دنباله هندسی است}$$

$$\text{مقدار نسبت دنباله هندسی} = \boxed{q}$$

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$$S_n = a_1 + a_r + \dots + a_n \rightarrow S_n = a_1 + a_1 + d + a_1 + d + \dots + a_1 + (n-1)d \rightarrow S_n = n a_1 + \frac{n(n-1)}{2} d$$

$$\text{ا) } S_n = \frac{n}{2} (t_{\text{اول}} + t_{\text{آخر}}) \Rightarrow S_n = \frac{n}{2} (a_1 + (n-1)d) \Rightarrow S_n = \frac{n}{2} (2a + (n-1)d)$$

$$\Rightarrow a + (a + (n-1)d) = a + a + (n-1)d = 2a + (n-1)d$$

$$\text{ب) } \left. \begin{aligned} S_n &= a_1 + a_1 q + a_1 q^r + \dots + a_1 q^{n-1} \\ S_n q &= a_1 q + a_1 q^r + a_1 q^r + \dots + a_1 q^n \end{aligned} \right\} \ominus \Rightarrow S_n - S_n q = a_1 - a_1 q^n \Rightarrow S_n(1-q) = a_1(1-q^n)$$

$$\Rightarrow S_n = a_1 \left(\frac{1-q^n}{1-q} \right)$$

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