

الف) $q=2 \rightarrow a_n q^{n-1} = \frac{1}{2} \times 2^9 = \frac{1}{2} \times 512 = 256 \checkmark$

ب) $\frac{a_1 q}{a_1 r} \rightarrow 2^{14-1} = 9^2 \rightarrow 2^7 = 128 \checkmark$

فقط اینها!

ج) $a_4 = \frac{1}{2} \times 2^3 = 4$ $a_{10} = 256$ $\rightarrow 2^8, 2^7, 2^6, 2^5, 2^4, 2^3, 2^2, 2^1, 2^0$

$b^2 = ac \rightarrow a_2 \times a_{10} = a_n \times a_n \rightarrow 2n = 12 \rightarrow n = 6$

د) $\frac{1}{2} \times 2^{n-1} = 128 \rightarrow 256 = 2^{n-1} \rightarrow n = 9 \checkmark$ $a_n = a q^{n-1} = \frac{1}{2} \times 2^8 = 32$

(1, 1.75)

1

$a_0 = 12$ $\frac{a_1}{a_m} \rightarrow q^2 = 1$ $q = 2$
 $a_n = 99$

$\frac{a_2}{a_1} = 2$

$a_{10} = \frac{2}{2} \times 2^9 = 2^9 = 512 \checkmark$

$a_1 = a_1 = 12$
 $a_2 = a_1 = 12$

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2

$a_1 = \frac{a_2}{q}$

$a_2 = \frac{a_2}{q}$

$a_4 = a_2 q$
 $a_8 = a_2 q^3$

$\frac{a_2}{q^2} \times \frac{a_2}{q} \times a_2 q \times a_2 q^2 \times a_2 q^3 = a_2^5 = 243$
 $a_2 = 3 \checkmark$

ب) $a_1 \times a_8 = \frac{a_2}{q} \times a_2 q^3 = a_2^2 = 9 \checkmark$

(2)

3

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

$18 \times 2 = 2^a + b$

$2^0 = 2^a + b$

$a + b = 0$

وسطی = $\frac{a+b}{2} = \frac{a}{2} \checkmark$

(2)

4

$q = 1 - q$ $a_n = a$ $a_{n+1} = a+1$

$a^2 = (a+1)(1-a) = a - a^2 + 1 - a = -a^2 + 1 \rightarrow 2a^2 = 1$

$a = \pm \frac{1}{\sqrt{2}} = \pm \frac{\sqrt{2}}{2}$

فقط 20 و 40 میشه

(1.75)

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$$a_1 + ar = a + aq^r = 11 \rightarrow a(1+r) = 11$$

$$ar + ar^2 = aq + aq^r = 12 \rightarrow a(q + q^r) = 12$$

$$\frac{a(1+r^2)}{a(q+q^r)} = \frac{12}{11}$$

(2)

$$\rightarrow (q^r - r) + (q^r - r) - (q \times q + r) = 0 \implies (q-r)(aq^r + bq^r + c) = 0 \implies -aq^r + bq^r + cq - 2aq^r - 2bq^r - 2c = 0$$

$$(q-r) = 0 \implies q=r \rightarrow (q-r)(q^r + r) = 0 \implies q = \frac{-1 \pm \sqrt{1+11}}{2} \rightarrow \begin{cases} 1 \\ -1 \end{cases}$$

$$\rightarrow 1 + r = 11 \rightarrow a = 1, r = 9 \quad \text{(2V) } \checkmark$$

$$\frac{0}{q} \times a \times aq = rV$$

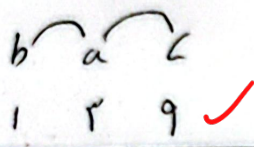
$$a^r = rV$$

$$a = r$$

$$q = r$$

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

(1, 2)



$$1 + r + q = 12$$

$$\underline{9, 3, 1}$$

$$ii) a_1 \left(\frac{q^n - 1}{q - 1} \right) = r \left(\frac{r^{10} - 1}{r - 1} \right) = 1090 \text{ (1)}$$

(2)

$$ii) \sqrt{(a_1 \cdot a_n)^n} = (r \times r \times r^9)^n = (r \times r^9)^n \checkmark$$

arithmetic a, aq, aq^2, aq^3, \dots

$$b_n = a_{n+1} - a_n = aq^n - aq^{n-1} = aq^{n-1}(q-1)$$

$$b_1 = ar - a_1 = aq - a = a(q-1)$$

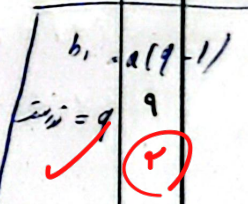
$$\frac{b_1}{b_1} = \frac{aq(q-1)}{a(q-1)} = q$$

$$b_2 = ar - ar = aq^2 - aq = aq(q-1)$$

$$\frac{b_2}{b_1} = \frac{aq^2(q-1)}{aq(q-1)} = q$$

$$b_3 = ar - ar = aq^3 - aq^2 = aq^2(q-1)$$

$$\frac{b_n}{b_{n-1}} = q$$



(2)

$$ii) \frac{n}{r} (ard) = \frac{n}{r} (ra + (n-1)d)$$

$$\frac{n(n+1)}{r}$$

$$ar + ar + ar + \dots + ar + (n-1)d$$

$$nar + (d + d + d + \dots + (n-1)d)$$

$$nar + (1 + 1 + \dots + (n-1))d \rightarrow \frac{na^2}{r} + \frac{(n-1)d}{r}$$

$$S = a + aq + aq^2 + aq^3 + \dots + aq^{n-1}$$

$$qS = aq + aq^2 + \dots + aq^{n-1} + aq^n$$

$$S - qS = a - aq^n$$

$$S(1-q) = a(1-q^n)$$

$$S = \frac{a(1-q^n)}{1-q}$$

(2)

$$\frac{n}{r} (ra + (n-1)d)$$