

کلاس دهم B

1/ شایان زیدی 14/10

$$a_n = \frac{1}{2} \text{ و } 1 \text{ و } 2 \text{ و } \dots$$

$$a_{10} = \frac{1}{2} \times 2^9 = 256 \quad \text{الف}$$

$$\frac{a_{14}}{a_{13}} = 2^2 = 2^2 = 4 \quad \text{ب}$$

$$4 \text{ و } 1 \text{ و } 16 \text{ و } 32 \text{ و } 64 \text{ و } 128 \text{ و } 256 \quad \text{ج}$$

$$128 = \frac{1}{2} \times 2^n \Rightarrow n=8 \quad \text{د}$$

$$a_1 = 96$$

$$\frac{a_1}{a_5} = 2^4 = \frac{96}{12} = 8 \Rightarrow 2=2$$

$$a_{10} = a_1 \times 2^9 = 96 \times 2^9 = 256 \quad \text{ه}$$

$$a_1 \times a_2 \times a_3 \times a_4 \times a_5 = 2^{14}$$

$$a_1 \times a_5 = a_2 \times a_4 = a_3 \times a_3$$

$$\Rightarrow a_2 \times a_2 \times a_3 \times a_3 \times a_3 = 2^{14} = 2^5 \Rightarrow a_3 = 2 \quad \text{الف}$$

$$a_1 \times a_5 = a_3 \times a_3 = 2 \times 2 = 4 \quad \text{ب}$$

$$2^b \text{ و } 2^{\sqrt{2}} \text{ و } 2^a$$

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

$$\frac{a+b}{2} = 2/2 = 1 \quad \text{ج}$$

$$a_3 = 1-n$$

$$a_7 = n$$

$$a_{11} = n+1$$

$$\frac{a_7}{a_3} = \frac{a_{11}}{a_7} = 2^2 \Rightarrow \frac{n}{1-n} = \frac{n+1}{n}$$

$$\Rightarrow n^2 = n+1-n^2-n \Rightarrow 2n^2 = 1 \Rightarrow n^2 = \frac{1}{2}$$

$$\Rightarrow n = \pm \frac{1}{\sqrt{2}} \Rightarrow n = \pm \frac{1}{\sqrt{2}} \quad \text{د}$$

فقط مقدار + قابل قبول است زیرا به ازای $x = \frac{1}{\sqrt{2}}$ جلات فرد با هم
نمونه علامت می شوند

$$\begin{aligned}
 a_1 + a_2 &= 21 \Rightarrow \frac{a_1 + a_1 q^2}{a_1 q + a_1 q^2} = \frac{a_1(1+q^2)}{a_1(q+q^2)} = \frac{21}{12} \\
 a_2 + a_3 &= 12 \\
 \Rightarrow q &= 3 \text{ و } a_1 = 1 \quad \text{بزرگترین} = a_4 = 1 \times 27 = 27 \quad \checkmark
 \end{aligned}$$

$$a_1 + a_2 + a_3 = 13 \Rightarrow a_1 + a_1 q + a_1 q^2$$

$$a_1 \times a_2 \times a_3 = 27 = a_1^3 q^3$$

$$a_1 \times a_3 = a_2^2 \Rightarrow a_2 \times a_2 \times a_2 = 27 \Rightarrow a_2 = 3 \text{ و } a_1 = 1 \text{ و } a_3 = 9$$

$$\begin{aligned}
 a_n = 2 \times 3 \times 1 \times \dots \Rightarrow q &= 3 \quad \left(\frac{q^n - 1}{q - 1} \right) a_1 = S_n = 10 \Rightarrow \frac{3^n - 1}{3 - 1} = 10 \\
 3^n - 1 &= 20 \Rightarrow 3^n = 21 \quad \checkmark
 \end{aligned}$$

(الف)

$$D_n = (a_1 \times L)^{\frac{n}{r}} \Rightarrow D_{10} = (2 \times 3 \times 9 \times 27)^{\frac{10}{4}} = 27 \times 27 \times 27 \times 27 \quad \checkmark$$

(ب)

$$a_n = a_1 q^{n-1} \Rightarrow a_{10} = 2 \times 3^9 = 39366$$

$$a_n = a, aq, aq^2, aq^3, \dots$$

$$a - aq = a(1-q)$$

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

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

$$a_n = a(1-q) + aq(1-q) + aq^2(1-q) + \dots$$

$$q' = q \quad \checkmark$$

$$\begin{aligned}
 S_n &= a_1 + a_2 + a_3 + \dots + a_n = a_1 + a_1 + d + a_1 + 2d + \dots + a_1 + (n-1)d \\
 &= na_1 + \left(\frac{n^2 - n}{2} \right) d \Rightarrow \frac{n}{2} (2a_1 + (n-1)d)
 \end{aligned}$$

(الف - 10)

$$(S = a + aq + aq^2 + \dots + aq^{n-1}) \times q \Rightarrow Sq = aq + aq^2 + \dots + aq^n \quad \checkmark$$

(ب)

$$\begin{aligned}
 Sq - S &= (aq + aq^2 + \dots + aq^{n-1} + aq^n) - (a + aq + aq^2 + \dots + aq^{n-1}) \\
 \Rightarrow Sq - S &= aq^n - a \Rightarrow S(q-1) = a(q^n - 1) \Rightarrow S = a \frac{(q^n - 1)}{q - 1}
 \end{aligned}$$

(ج)