

Subject .

Year.

Month.

Day.

الف) $\frac{1}{2}, 1, 2, \dots \Rightarrow a_1 = \frac{1}{2}, a_2 = 1$

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

سوال ج) $a_1, a_2, a_3, \dots \rightarrow a_n = a_1 q^{n-1} = \frac{1}{2} \times 2^{n-1} = 2^{n-2}$

ج) $\frac{a_{14}}{a_{13}} = \frac{2^{14}}{2^{13}} = 2^1 = 2 \Rightarrow$ سوال ب

د) $128 = \frac{1}{2} \times 2^{n-1} \Rightarrow 256 = 2^{n-1} \Rightarrow n = 9$

$a_8 = 12, a_n = 99, \frac{a_n}{a_8} = 9^x = \frac{99}{12} = 11 \Rightarrow$

$\sqrt[n]{11} = 2 \Rightarrow 9 = 2 \Rightarrow a_1 = 9^0 \times a_8 \Rightarrow a_1 = 12 \times 2^8 = 1536$

الف) $a_1 \times a_2 \times a_3 \times a_4 \times a_5 = 256$

$a_1 \times a_5, a_2 \times a_4 = a_3 \times a_3 \Rightarrow a_3^2 = 256 \Rightarrow a_3 = 16$

ب) $a_1 \times a_5 = a_3^2 \Rightarrow 16^2 = 256$

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

$a_n \times a_p = a_q^2 \quad (1+u)(1-u) = u^2$

$\Rightarrow 1-u^2 = u^2 \Rightarrow 1 = 2u^2 \Rightarrow \frac{1}{2} = u^2 \Rightarrow u = \pm \frac{\sqrt{2}}{2}$

چون $\frac{\sqrt{2}}{2} = u$ باید u مثبت

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$$a_1 + a_2 = 1 \Rightarrow a_1 + a_1 q^2 = 1 \quad a(1+q^2) = 1 \quad -9$$

$$a_2 + a_3 = 1 \Rightarrow a_1 q + a_1 q^3 = 1 \quad aq(1+q^2) = 1$$

$$\Rightarrow \frac{a(1+q^2)(1+q^2)}{aq(1+q^2)} = \frac{1}{1} = \frac{1}{q}$$

$$\Rightarrow \frac{1+q^2}{q} \cdot \frac{1}{q} = 1 \Rightarrow 1+q^2 = q^2 \Rightarrow 1 = 0$$

$$\Rightarrow 1+q^2 = 1 \Rightarrow q^2 = 0 \Rightarrow q = 0$$

$$\Rightarrow q = 0, \frac{1}{q}$$

$$a_1 + a_1 q^2 = 1 \Rightarrow a_1 + 1 = 1 \Rightarrow a_1 = 0 \quad \leftarrow q = 0$$

$$1, 0, 1, 0$$

$$1, 0, 1, 0 \quad \leftarrow q = \frac{1}{q}$$

$$aq^{-1} + a + aq = 1 \Rightarrow \frac{1}{q} + 1 + q = 1 \Rightarrow \frac{1}{q} + q = 0$$

$$\Rightarrow \frac{1+q^2}{q} = 0 \Rightarrow 1+q^2 = 0 \Rightarrow q^2 = -1 \Rightarrow q = \pm i$$

$$aq^{-1} + a + aq = 1 \Rightarrow a^2 = 1 \Rightarrow a = \pm 1$$

$$1+q^2 = 0 \Rightarrow q^2 = -1 \Rightarrow q = \pm i$$

$$\frac{1}{q}, 1, q \rightarrow \frac{1}{i}, 1, i \rightarrow q = i, \frac{1}{q} = -i$$

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الف) 2, 4, 18, ...

$$S_{1,2} = r \left(\frac{r^n - 1}{r - 1} \right) = \frac{r^n - 1}{r - 1}$$

$$\Rightarrow r^1 + r^2 + r^3 + \dots + r^n = \frac{r^n - 1}{r - 1}$$

$$a_1 q \times d, a_1 q^2 \times d, \dots, a_1 q^n \times d$$

a, aq, aq^2, aq^3, ...

$$\Rightarrow aq - a, aq^2 - aq, aq^3 - aq^2, \dots$$

$$\Rightarrow a(q-1), aq(q-1), aq^2(q-1), \dots$$

↓
جواب: q ضرب در هر یک از (q-1) ها

$$\text{الف) } S_n = a_1 + a_1 + d + \dots + a_1 + (n-1)d$$

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

$$= n(a_1) + \frac{n(n-1)}{2}d = \frac{n}{2} (2a_1 + (n-1)d)$$

↓
اینجا فرمول حساب مجموع اعداد 1 تا n

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

$$\Rightarrow S_n = a \left(\frac{q^n - 1}{q - 1} \right) \Rightarrow S_n = a + aq + \dots + aq^{n-1}$$

$$\Rightarrow qS_n = aq + aq^2 + \dots + aq^n$$

$$\Rightarrow S_n - qS_n = (a - aq) + (aq - aq^2) + \dots + (aq^{n-1} - aq^n)$$

$$\Rightarrow S_n - qS_n = a - aq^n \Rightarrow S_n(1-q) = a(1-q^n) \Rightarrow S_n = \frac{a(1-q^n)}{(1-q)}$$