

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

$\Rightarrow a_1 = \frac{1}{r} \times r^2 = r \Rightarrow r^2 = r^0 \Rightarrow r = 1$ ✓

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

ج) $\frac{a_{14}}{a_{13}} = \frac{r^{14}}{r^{13}} = r = 14 \Rightarrow$ سوال ب ✓

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د) $r^2 = \frac{1}{r} \times q^{n-1} \Rightarrow r^3 = q^{n-1} \Rightarrow n = 4$ ✓

$a_8 = 14, a_9 = 44 \Rightarrow \frac{a_9}{a_8} = q = \frac{44}{14} = \frac{22}{7} = 1$ ✓

2

$r^2 = r \Rightarrow q = r \Rightarrow a_1 = q^2 \times a_8 \Rightarrow a_1 = 14 \times \frac{22}{7} = 44$ ✓

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

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

ب) $a_1 \times a_5 = a_3^2 \Rightarrow (4) \times (16) = 64$ ✓

$r^a \times r^b = (r^{\sqrt{r}})^2 \Rightarrow r^{a+b} = r^2 \Rightarrow a+b = 2 \Rightarrow \frac{a+b}{r} = \frac{2}{r} = r^{\sqrt{r}-1}$ ✓

2

$a_{11} \times a_{19} = a_{15}^2 \Rightarrow (1+u)(1-u) = u^2$

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

2

چون $\frac{\sqrt{2}}{2} = u$ ✓

Subject .

Year.

Month.

Day.

$$a_1 + a_2 = 1 \Rightarrow a_1 + a_1 q = 1 \Rightarrow a(1+q) = 1$$

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

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

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

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

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

$$a_1 + a_1 q = 1 \Rightarrow a_1(1+q) = 1 \Rightarrow a_1 = \frac{1}{1+q}$$

$$1, \frac{1}{2}, \frac{1}{4}$$

$$1, \frac{1}{2}, \frac{1}{4}, \frac{1}{8} \leftarrow q = \frac{1}{2}$$

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

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

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

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

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

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الف) 2, 4, 18, ...

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

(2)

$$\Rightarrow r^n = 1 + r + r^2 + \dots + r^{n-1} \quad \checkmark$$

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

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

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

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

(2)

↓ $\checkmark$ $\leftarrow$ جملات n ضرب q (مربوبه q)

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

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

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

↓ $\checkmark$ $\leftarrow$ اشیاء فرد طوطی اعداد n تا

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

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

(2)

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

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

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