

19, 17, 5

دوم (مختار)

تکلیف 14

مدرسه باقری

الف) $a_n = \frac{1}{r} \times \frac{1}{r} \times \frac{1}{r} \times \dots$

$a_{10} = ar^{n-1} = \frac{1}{r} \times r^9 = r^8 = \frac{128}{1}$

ب) $\frac{a_{11}}{a_{13}} = r^k = r^k = \frac{14}{1}$

ج) $a_k = ar^k = \frac{1}{r} \times r^k = k$
 $a_{10} = ar^9 = \frac{1}{r} \times r^9 = 128$

$\sqrt{128 \times k} = \sqrt{1024} = 32$

$\Rightarrow ar^{n-1} = \frac{1}{r} \times r^{n-1} \Rightarrow r^{n-2} = 128 = r^7$
 $n-2=7 \Rightarrow n=9$

$aq^k = 12$
 $aq^7 = 94$

$\Rightarrow q^3 = \frac{94}{12} = 1 \Rightarrow q = 1$

$aq^k = 12$
 $aq^7 = 12$

$14a = 12 \Rightarrow a = \frac{12}{14}$

$a_{10} = aq^9 = \frac{12}{14} \times 1^9 = 12 \times 1 = 12 \times 32 = 384$

$a_{10} = 384 \rightarrow (aq^7)^2 = 384 = 12 \Rightarrow aq^7 = a_{10} = 12$

الف) $a_{10} = aq^7 = 12$

ب) $a_1 \times a_{10} = a^2 q^k = (aq^7)^2 = 12^2 = 144$

$(\sqrt{12})^2 = r^a \times r^b = 12 = r^{a+b} \Rightarrow r^{a+b} = 12$

الف) $\frac{a+b}{r} = \frac{12}{1} = 12$

$aq^r = 1-n$
 $aq^4 = n$
 $aq^{10} = n+1$

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

$n^2 = n - n^2 + 1 - n$
 $2n^2 = 1$

$n^2 = \frac{1}{2}$

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

فقط $n = \frac{1}{\sqrt{2}}$ درسته!

$$a + aq^3 = 11 \rightarrow a(1 + q^3) = 11 \quad \star$$

(4)

$$aq + aq^9 = 12 \rightarrow aq(1 + q^8) = 12$$

$$\frac{a(1+q)(1+q^9-q)}{aq(1+q^8)} = \frac{11}{12} = \frac{1-q+q^9}{q} = \frac{1}{q} \Rightarrow 12q = 12 - 12q + 12q^9 \Rightarrow 12q^9 - 10q + 12 = 0$$

$$\text{نلاحظ} \Rightarrow q^9 - 10q + 12 = 0 \Rightarrow (q-1)(q-9) = 0$$

$$\frac{1}{q} \leftarrow \mu = \frac{9}{q}$$

$$\star a(1 + \mu^3) = 11 \Rightarrow a = 1 \Rightarrow 1, 3, 9, 27$$

$$\star a(1 + (\frac{1}{\mu})^3) = 11 \Rightarrow a = 27 \Rightarrow 27, 9, 3, 1$$

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$$a + aq + aq^9 = 13$$

(5)

$$a \times aq \times aq^9 = a^3 q^{10} = (aq)^3 = 13^3 \Rightarrow aq = 13$$

$$\frac{13}{q} + 13 + 13q = 13 \xrightarrow{\times q} 13 + 13q + 13q^9 = 13q \Rightarrow 13q^9 - 10q + 13 = 0$$

$$q^9 - 10q + 13 = 0 \Rightarrow (q-1)(q-9) = 0$$

$$\begin{array}{l} q \Rightarrow 1 \xrightarrow{\div 13} q = \frac{1}{13} \\ q \Rightarrow 9 \xrightarrow{\text{نلاحظ}} q = 13 \end{array}$$

$$\boxed{9, 13, 1}$$

$$\boxed{1, 13, 9}$$

$$\text{الف) } S_{10} = 1 \left(\frac{1 - 13^{10}}{1 - 13} \right) = 13^{10} - 1$$

$$\text{ب) } a_{10} = 1 \times 13^9$$

(1)

$$\sqrt{(a_1 \times a_{10})^{10}} = (1 \times 1 \times 13^9)^{10} = (1 \times 13^9)^{10}$$

9

$$a, aq, aq^2, aq^3, aq^4, \dots$$

$$aq^4 - aq^3 = aq^3(q-1)$$

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

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

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

9

10

$$1) a_1, a_2, a_3, \dots, a_n$$

$$a + (a+d) + (a+2d) + \dots + (a+(n-1)d)$$

$$\frac{a + a + (n-1)d}{2} \times n \Rightarrow \frac{n}{2} (2a + (n-1)d)$$

$$2) S = a_1 + a_2 + a_3 + \dots + a_n$$

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

$$qS = aq + aq^2 + aq^3 + \dots + aq^n$$

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

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