پاسخ سوالات تکلیف ۵ ریاضیات پایه یازدهم

(۱)

$$\frac{a}{q} + a + aq = \frac{a + aq + aq^2}{q} = 21$$

$$\frac{a}{q} \times a \times aq = a^3 = 64 \rightarrow a = 4$$

$$\Rightarrow \frac{4}{q}(1 + q + q^2) = 21q \rightarrow 1 + q + q^2 = \frac{21}{4}q$$

$$\frac{4}{4} - \frac{21}{4}q = \frac{-17}{4}q$$

$$q^2 - \frac{17}{4}q + 1 = 0 \quad \xrightarrow{\times 4} \quad 4q^2 - 17q + 4 = 0$$

$$\Delta = b^2 - 4ac$$

$$\Delta = 289 - 4(4)(4) = 225$$

$$x = \frac{-b \pm \sqrt{\Delta}}{2a} = \frac{17 \pm 15}{8} \rightarrow q = x = \frac{1}{4}$$ غیر صعودی

$$\rightarrow x = 4$$

(۲)

$$x^2 + 4 ,\ 2x ,\ x^2 - 2$$

$x = 2 \rightarrow 8, 4, 2$ ($\times \frac{1}{2} = q$) نزولی

$x = -2 \rightarrow 8, -4, 2$ ✗

$$4x^2 = (x^2 + 4)(x^2 - 2) = x^4 + 2x^2 - 8$$

$$x^4 - 2x^2 - 8 = 0 \rightarrow (x^2 - 4)(x^2 + 2) = 0$$

$x^2 = 4$ قبول $x^2 = -2$ رد (نداریم ریشه حقیقی)

$$x = \pm 2$$

$$S_7 = a_1\left(\frac{1 - q^7}{1 - q}\right) \rightarrow 8\left(\frac{1 - (\frac{1}{2})^7}{\frac{1}{2}}\right) = 16\left(\frac{128 - 1}{8 \times 128}\right) = \frac{127}{8}$$

۳

$1+q+q^{2}+q^{3}+q^{4}=\frac{۱۲۱}{۸۱}$

$a_1+a_2+a_3+a_4+a_5=a+aq+aq^{2}+aq^{3}+aq^{4}$

$=a(1+q+q^{2}+q^{3}+q^{4})=۲۴۳\left(\frac{۱۲۱}{۸۱}\right)=۳۶۳$

۴

$d=\frac{۶۴-۱}{۶}=\frac{۶۳}{۶}=۱۰/۵$

۱ , ○ , ○ , Ⓐ(B) , ○ , ○ , ۶۴

(×۲ , +۱۰/۵)

$A=۱+۳(۱۰/۵)=۳۲/۵$

$B=۱\times ۲^{۳}=۸$

۴۰/۵

$q^{۵+۱}=\frac{۶۴}{۱}\Rightarrow q=۲$

۵

$d=-\frac{۹۵}{۴}-(-۲۴)=\frac{۱}{۴}$

$a_{۱۰۱}=-۲۴+۱۰۰\left(\frac{۱}{۴}\right)=۱$

$a_{۸}=۱۲۸\times q^{۷}=۱\Rightarrow q=\frac{۱}{۲}$

(۶)

a_2, a_7, a_9

$a+2d, a+5d, a+8d$

هندسی ← $q = \frac{9-7}{7-2} = \frac{2}{4} = \frac{1}{2}$ ← تصاعد

$(a+4d)^2 = (a+2d)(a+8d)$

$a^2 + 16d^2 + 16ad = a^2 + 10ad + 16d^2$

$10d^2 = -2ad$

$-10d = a \rightarrow d = \frac{-a}{10}$

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(۷)

a_1, a_2, a_3

$a+d, a+3d, a+7d$

$2a \xrightarrow{\times 2} 4d \xrightarrow{\times 2} 8d \rightarrow q = 2$

$(a+3d)^2 = (a+d)(a+7d)$

$a^2 + 9d^2 + 6ad = a^2 + 8ad + 7d^2$

$2d^2 = 2ad$

$a = d$

$a_1 = a + d = 2a = \frac{1}{4} \rightarrow a = \frac{1}{4} \times \frac{1}{2} = \frac{1}{8}$

$a_{10} = \frac{1}{4}(2)^9 = 128$

(۸)

$3a_2$ و $2a_3$ و a_4

$3aq$ و $2aq^2$ و aq^3

$$2aq^2 = \frac{3aq + aq^3}{2} \rightarrow -4aq^2 + 3aq + aq^3 = 0$$

$$\Rightarrow aq(-4q + 3 + q^2) = 0$$

$aq = 0 \rightarrow a = 0$ ق ق غ

$$\Rightarrow (q-1)(q-3) = 0 \begin{cases} q = 1 & \alpha = \text{غیرثابت} \\ q = 3 \end{cases}$$

$\boxed{q = 3}$

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(۹)

$$d = \frac{7}{4} - 2 = \frac{-1}{4}$$

$$a_4 = 2 + 3\left(-\frac{1}{4}\right) = \frac{5}{4}$$

$$a_8 = 2 + 7\left(-\frac{1}{4}\right) = \frac{1}{4}$$

$$a_{13} = 2 + 12\left(\frac{-1}{4}\right) = -1$$

$$\rightarrow \frac{5}{4} + x,\ \frac{1}{4} + x,\ -1 + x$$

$$\rightarrow \left(\frac{1}{4} + x\right)^2 = \left(x + \frac{5}{4}\right)(x - 1)$$

$$\Rightarrow \frac{1}{16} + x^2 + \frac{1}{2}x = x^2 + \frac{1}{4}x - \frac{5}{4} \rightarrow x = \frac{-21}{4}$$

$$-4,\ -5,\ \frac{-25}{4} \rightarrow q = \frac{-5}{-4} = \boxed{\frac{5}{4}}$$

10

$a_1 + aq^3 + aq^9 = 73$

$t_1 = a$ [scribble]

$t_4 = a_4 = aq^3$

$t_{10} = a_7 = aq^9$

$t_4 = aq^3$
$t_2 = 1+d$
$\left.\right\} \xrightarrow{a_t} aq^3 = a+d \rightarrow d = a(q^3-1)$

$t_{10} = aq^9 =$ [scribble] $a + 9a(q^3-1) = a + 9aq^3 - 9a$

$\Rightarrow aq^9 - 9aq^3 + 8a = 0 \rightarrow a(q^6 - 9q^3 + 8)$

$\Rightarrow q^3 = \frac{9 \pm \sqrt{18-32}}{2} \rightarrow \begin{cases} q^3 = 8 \Rightarrow q = 2 \\ q^3 = 1 \Rightarrow q = 1 \end{cases}$

$\rightarrow q = 1 \rightarrow \underbrace{a + a + a}_{3a} = 73 \rightarrow a = \frac{73}{3}$

$d = a(q^3-1) = \frac{73}{3} \times (1-1) = \boxed{0}$

$q = 2 \rightarrow a + 8a + 64a = 73$

$a = 1 \rightarrow d = a(q^3-1)$

$d = 1(8-1) = \boxed{7}$