

سوال 1

$$\frac{a}{q} + a + aq = 21 \Rightarrow \frac{a}{q} + a + aq = 21 \Rightarrow \frac{a(1+q+q^2)}{q} = 21$$

$$\frac{a}{q} \times a \times aq = 64 \Rightarrow 3a = 64 \Rightarrow a = \frac{64}{3}$$

$$\Rightarrow \frac{64}{3} + \frac{64}{3}q + \frac{64}{3}q^2 = 21q$$

$$\Rightarrow 64q^2 - 17q + 64 = 0 \Rightarrow q^2 - 17q + 16 = 0 \Rightarrow (q-16)(q-1) \Rightarrow q = 16 \text{ or } 1$$

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سوال 2

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

$$x^2 - 2x^2 - 1 = 0 \Rightarrow (x^2 + 2)(x^2 - 4) = 0 \Rightarrow \begin{cases} x^2 = -2 \\ x^2 = 4 \end{cases}$$

$$x = 2 \Rightarrow 1, 9, 49, 25, \dots \Rightarrow q = \frac{1}{3}$$

(2)

نمودار با توجه به روند نزولی و صعودی، امتحان شده می کنیم

$$S_V = a_1 \left(\frac{q^n - 1}{q - 1} \right) \Rightarrow 1 \left(\frac{\left(\frac{1}{3} \right)^5 - 1}{\frac{1}{3} - 1} \right) = \frac{-\frac{127}{243} + 1}{-\frac{2}{3}} = \frac{-\frac{127}{243} + \frac{243}{243}}{-\frac{2}{3}} = \frac{-\frac{127}{243} + \frac{243}{243}}{-\frac{2}{3}} = \frac{127}{121}$$

$$S_8 = a + aq + aq^2 + aq^3 + aq^4 + aq^5 + aq^6 + aq^7$$

$$= \frac{a(1+q+q^2+q^3+q^4+q^5+q^6+q^7)}{1} = \frac{121}{41} \times \frac{121}{41} = 363$$

سوال 3

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$$\frac{64-1}{8-1} = \frac{63}{7} = 9 \Rightarrow \frac{21}{1} = 10/8 = 2.5$$

$$q^2 + 1 = \frac{6}{a} \Rightarrow q^2 = \frac{6}{1} \Rightarrow q = \pm 2.5$$

سوال 4

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$$A+B = \begin{cases} 3 \times 2 + 1 = 7 \\ 2 \times 2 + 1 = 5 \end{cases}$$

$$1, 2, 4, 8, 16, 32, 64 \Rightarrow B = 16$$

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سوال 5

$$a_n = a + (n-1)d \Rightarrow a_{11} = -24 + (10) \frac{1}{2} = -24 + 5 = -19$$

$$\frac{-92}{2} - (-19) = \frac{-92}{2} + \frac{38}{2} = \frac{-54}{2} = -27$$

$$a_n = aq^{n-1} \Rightarrow 121 \times q^5 = 1 \Rightarrow q^5 = \frac{1}{121} \Rightarrow q = \frac{1}{11}$$

(1,5)

$$\begin{array}{ccc} a_v & a_v & 1 \\ a+vd & a+vd & a+vd \end{array}$$

$$(a+vd)^v = (a+vd)(a+vd)$$

$$a^v + vvd + 1vd = a^v + 1vd + 1vd$$

$$v \cdot d = -vd$$

$$-1 \cdot d = a \Rightarrow d = \frac{-a}{1} \checkmark$$

چون نغته جلات متمایزه!

$d = 0$

سوال 4

(2)

$$\begin{array}{ccc} a_v & a_v & a_v \\ a+vd & a+vd & a+vd \end{array}$$

$$(a+vd)^v = (a+vd)(a+vd)$$

$$\Rightarrow a^v + vvd + 1vd = a^v + 1vd + 1vd$$

$$\Rightarrow vd = vvd$$

$$\Rightarrow d = a$$

$$\Rightarrow \begin{cases} a_v = 2a \\ a_v = 4a \\ a_v = 8a \end{cases}$$

$$\Rightarrow a_{10} = \frac{1}{5} \times 12 = \frac{12}{5} = 2.4$$

$$= 128 \checkmark$$

$\Rightarrow q = 2$

سوال 13

(2)

$$\begin{array}{ccc} vaq & vaq^v & aq^w \\ vaq^v = \frac{vaq + aq^w}{v} \Rightarrow vaq^v = vaq + aq^w \Rightarrow vaq^v - vaq = aq^w \end{array}$$

$$\Rightarrow vaq^v - vaq = aq^w \Rightarrow vaq^v - vaq = aq^w$$

$$\Rightarrow vaq^v - vaq = aq^w \Rightarrow vaq^v - vaq = aq^w$$

$$\Rightarrow vaq^v - vaq = aq^w \Rightarrow vaq^v - vaq = aq^w$$

$$a_v = 2 + \frac{-w}{5} = \frac{2}{5}$$

$$a_1 = 2 + \frac{-v}{5} = \frac{1}{5}$$

$$a_w = 2 + \frac{-14}{5} = -1$$

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$$\begin{array}{ccc} \frac{2}{5} + x & \frac{1}{5} + x & -1 + x \end{array}$$

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

$$\frac{1}{16} + \frac{v}{4} + \frac{v}{4} = \frac{2}{5} + x + \frac{-1}{5} + x \Rightarrow \frac{v}{4} = \frac{-4x}{14} \Rightarrow x = \frac{v}{4}$$

$$\Rightarrow q = \left(\frac{1}{5}\right)^{\frac{1}{4}} \checkmark$$

سوال 10

(1,5)

$$-(a+d) = aq^w \Rightarrow aq^w - a = d \Rightarrow a(q^w - 1) = d \Rightarrow q^w - 1 = \frac{d}{a}$$

$$a + d = aq^v$$

$$a + a\left(\frac{d}{a}\right) = aq^v$$

$$a + d = aq^v$$

$$a + a\left(\frac{d}{a}\right) = aq^v$$

$$a + d = aq^v$$

$$\Rightarrow q = 2 \Rightarrow a(1 + 2 + 4) = 12 \Rightarrow a = 1$$

حالت دوم $\rightarrow q = 1$ $d = 0$