

سوال ۱

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

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

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

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

سوال ۲

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

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

$$x = 2 \rightarrow 1, 9, 49, 25, \dots \Rightarrow q = \frac{1}{4}$$

$$x = -2 \rightarrow 1, 9, -49, 25, \dots \Rightarrow q = \frac{1}{4}$$

نیز از رابطه $x^2 = -2$ می توانیم $x = \pm \sqrt{-2}$ را به دست آوریم.

$$S_V = a_1 \left(\frac{q^n - 1}{q - 1} \right) \Rightarrow 1 \left(\frac{\left(\frac{1}{4} \right)^5 - 1}{\frac{1}{4} - 1} \right) = \frac{-\frac{1023}{1024}}{-\frac{3}{4}} = \frac{-1023}{-1} = 1023$$

سوال ۳

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

$$= a(1 + q + q^2 + q^3 + q^4 + q^5 + q^6 + q^7) = \frac{1}{2} \times \frac{121}{41} = \frac{121}{82}$$

$$1 + q + q^2 + q^3 + q^4 + q^5 + q^6 + q^7 = \frac{121}{41}$$

$$a_1 = \frac{121}{82}$$

سوال ۴

$$\frac{64-1}{8-1} = \frac{63}{7} = \frac{21}{1} = 10/8 = 5/4$$

$$q^2 + 1 = \frac{b}{a} \Rightarrow q^2 = \frac{64}{1} \Rightarrow q = \pm 8$$

$$A+B = \begin{cases} 34x+1 = 40.8 \\ 34x+1 = 24.5 \end{cases}$$

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

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

سوال ۵

$$a_n = a + (n-1)d \Rightarrow a_{11} = -24 + \left(\frac{100}{10} \right) \frac{1}{4} = -24 + 25 = 1$$

$$\frac{-92}{4} - (-24) = \frac{-92}{4} + \frac{96}{4} = \frac{4}{4} = 1$$

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

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

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

$$a^v + v a^v d + 1 v a d = a^v + 1 a d + 1 v d$$

$$v \cdot a^v = -v a d$$

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

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

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

$$\Rightarrow a^v + v a^v d + 1 v a d = a^v + \underbrace{v a d + a d + v d}_{1 a d}$$

$$\Rightarrow v d = v a d \Rightarrow d = a$$

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

$$\Rightarrow q = 2$$

$$\Rightarrow a_{10} = \frac{1}{2} \times 12 = \frac{12}{2} = 6$$

$$= 128$$

سوال 4

$$r a q \quad r a q^v \quad a q^w$$

$$r a q^v = \frac{r a q + a q^w}{r} \Rightarrow r a q^v = r a q + a q^w \Rightarrow r a q^v - r a q = a q^w$$

$$\Rightarrow r a (q^v - q) = a q^w \Rightarrow r (q^v - q) = q^w$$

$$- (q^v - q) = 0 \Rightarrow - (q^v - q) = 0$$

$$\Rightarrow q = \boxed{2}$$

$$\frac{v}{r} - 2 = -\frac{1}{r} = d$$

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

$$a_v = 2 + \frac{-v}{r} = \frac{1}{r}$$

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

$$\frac{2}{r} + x$$

$$\frac{1}{r} + x$$

$$-1 + x$$

$$\Rightarrow q = \frac{1+d}{r}$$

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

$$\frac{1}{16} + \frac{v}{4} + \frac{v^2}{4} = \frac{2}{r} + x + \frac{-1}{r} + x \Rightarrow \frac{v}{4} = \frac{-1}{r} + x \Rightarrow x = \frac{v}{4}$$

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

$$\begin{array}{l} -a - d = -a q^w \\ a + d = a q^v \end{array}$$

$$1 d = a q^v - a q^w$$

$$1 d = a q^w (q^v - 1)$$

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

سوال 10