سازمان سنجش تیزهوشان گروه B

۱.

$S_3 = a_1\left(\frac{q^3-1}{q-1}\right) = 21 \rightarrow a_1(q^2+q+1) = 21$

$a_1 \times a_2 \times a_3 = a_1^3 \times q^3 = 64 \qquad a_1 \times q = 4 \rightarrow a_1 = \frac{4}{q}$

$4q^2 + 4q + 4 = 21q \qquad 4q^2 - 17q + 4 = 0 \Rightarrow (4q-1)(q-4) = 0$

$q = 4 \rightarrow$ غ‌ق X

$q = 1/4$

۲.

$n^2+4, 2n, n^2-2 \qquad 0<q\leq 1$

$\frac{2n}{n^2+4} = \frac{n^2-2}{2n} \qquad n^4 + 4n^2 - 2n^2 - 8 = 4n^2 \rightarrow n^4 - 2n^2 - 8 = 0$

$(n^2+2)(n^2-4) = 0 \longrightarrow n^2 = 4 \Rightarrow 8, 4, 2 \rightarrow q = 1/2$

$S_7 = a_1\left(\frac{q^7-1}{q-1}\right) = 8\left(\frac{1-\frac{1}{128}}{1-1/2}\right) = 8\left(\frac{\frac{127}{128}\cdot 64}{1/2}\right) = \frac{127}{2}$

۳

$q^4+q^3+q^2+q+1 = \frac{121}{81} \qquad a_1 = 243 \qquad S_5 = (a_1(q^4+q^3+q^2+q+1)) =$ $\boxed{۲۴۳}$

۴.

$1 \underset{2}{\curvearrowright}, A \underset{2}{\curvearrowright} 64 \rightarrow$ حسابی $A = \frac{1+64}{2} = \frac{65}{2} = 32{,}5$

$1, B, 64 \rightarrow$ هندسی $\rightarrow B^2 = 64 \rightarrow B = \pm 8$

$A+B = 32{,}5 + 8 = 40{,}5$

$A+B = 32.5 - 8 = 24.5$

۵

$-24, \frac{95}{4}, \ldots \rightarrow -24, -23{,}75, \ldots$ $+0{,}25$

$a_n = -24 + (n-1)\,1/4$

$n = 101 \rightarrow -24 + 100 \times 1/4 = 1$ (25)

$128, a_2 \longrightarrow a_n = 128 \times q^{n-1} \qquad n = 8 \rightarrow 128 \times q^{n-1}$ (7)

$128 \times q^7 = 1 \rightarrow q = 1/2$

۶

$a_3, a_7, a_9 \qquad 2 = d^2 - 2ad$

$a_1+2d, a_1+6d, a_1+8d \qquad 2d(10d+a) = 0 \qquad d=0$

$\frac{a_1+6d}{a_1+2d} = \frac{a_1+8d}{a_1+6d} \rightarrow a_1^2 + 12da + 36d^2 = a_1^2 + 10ad + 16d \qquad d = \frac{-a_1}{10}$

دنباله هندسی (7)

a_2, a_4, a_8

a_1+d $\quad \frac{a_1+3d}{a_1+d} = \frac{a_1+7d}{a_1+3d} = q = 2$

a_1+3d

a_1+7d $\quad a_1^2 + 9d^2 + 6ad = a_1^2 + 8ad + 7d^2$

$2d^2 = 2ad \quad d(d-a) = 0 \quad d = 0$

$d = a \rightarrow q = 2$

$a_{10} = \frac{1}{4} \times 2^9 = 2^7 = 128$

$a_n = a_1 q^{n-1} \rightarrow a_1 = \frac{1}{4},\ q = 2 \rightarrow n = 10$

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(8)

$3a_2, 2a_3, a_4 \qquad aq^3 - 2aq^2 = 2aq^2 - 3aq$

$3aq, 2aq^2, aq^3$

$q^2 - 2q = 2q - 3 \qquad q^2 - 4q + 3 = 0$

$(q-1)(q-3) = 0 \rightarrow q = 1$

$q = 3$

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(9)

$a_n = 2 - \frac{(n-1)}{4} = \frac{8-n+1}{4} = \frac{9-n}{4}$

$\frac{9}{4} + m \qquad \frac{1}{4} + m \qquad -1 + m$

$\frac{m-1}{m+\frac{1}{4}} = \frac{m+\frac{1}{4}}{m+\frac{9}{4}} = \frac{4m-4}{4m+1} = \frac{4m+1}{4m+9} \rightarrow 16m^2 + 20m - 36 = 16m^2 + 1 + 8m$

$4m = -21 \quad m = -\frac{21}{4}$

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(10)

$a_1 + a_4 + a_7 = a_1(1+q^3+q^6) = 73$

$a_1,\ a_2 = a+d,\ a_{10} = a+9d$

$a+9d-a-d = a+d-a$

$8d = d \quad 7d = 0 \rightarrow d = 0 \rightarrow a_1, a_1, a_1$

قدر نسبت $= 0$