

الف ۱۴

نام و نام خانوادگی: آرتین فروتن

$$a_1 = \frac{1}{r} \quad q = r$$

سوال ۱

$$a_n = a_1 q^{n-1} \rightarrow a_n = \frac{1}{r} \times r^{n-1} \rightarrow a_{10} = \frac{1}{r} \times r^9 = r = \underline{256} \rightarrow \text{الف}$$

$$\frac{a_{14}}{a_{13}} = \frac{a_{13} q^r}{a_{13}} = q^r \rightarrow r^r = \underline{14} \rightarrow \text{ب}$$

$$a_4 = a_1 q^3 \rightarrow \frac{1}{r} \times r^3 = 4 \quad a_{10} = a_1 q^9 = \frac{1}{r} \times r^9 = 256 \quad b^r = ac$$

$$\sqrt{a_4 \times a_{10}} = \sqrt{4 \times 256} = \underline{32} \rightarrow \text{ج (واسطه هندسی)}$$

$$a_n = a_1 q^{n-1} \rightarrow 128 = \frac{1}{r} \times r^{n-1} \rightarrow n-1 = 1 \rightarrow n = \underline{2} \rightarrow \text{د}$$

$$\frac{a_n}{a_m} = \frac{a_1 q^n}{a_1 q^m} = q^{n-m} \rightarrow \frac{99}{12} = q^{n-m} \rightarrow q^3 = 1 \rightarrow q = \underline{2} \quad \text{سوال ۲}$$

$$a_{10} = a_1 \times q^9 \rightarrow 99 \times 2^9 = \underline{5184}$$

$$a_1 q^6 = 2 \times 2 \rightarrow (a_1 q^3)^2 = 2 \times 2 \rightarrow a_1 q^3 = \underline{2} \quad \text{سوال ۳}$$

$$\text{الف}) \rightarrow a_{10} = a_1 q^9 = \underline{3}$$

$$\text{ب}) \rightarrow a_1 \times a_{10} = a_1^2 q^9 = (a_1 q^3)^3 \rightarrow 3^3 = \underline{27}$$

سوال ۴) : $b^r = ac \rightarrow (\sqrt[r]{r})^r = r^a \times r^b \Rightarrow r^a = r^{a+b}$

$\Rightarrow a+b=w$

b, a حسابی : $\frac{a+b}{r} = \frac{w}{r}$

سوال ۵) a_r, a_r, a_{rr} $\frac{a_{rr}}{a_r} = \frac{a_r}{a_r} \rightarrow a_r^r = a_r \times a_{rr}$

$\rightarrow x^r = (x+1)(1-x) \rightarrow x^r = 1-x^r \rightarrow rx^r = 1 \rightarrow x^r = \frac{1}{r} \rightarrow x = \pm \frac{\sqrt[r]{r}}{r}$

سوال ۶) $a_1 + a_1 q^r = r1 \rightarrow a_1(1+q^r) = a_1(1+q)(1-q+q^r)$

$a_1 q + a_1 q^r = r1 \rightarrow a_1 q(1+q)$

$\frac{a_1(1+q)(1-q+q^r)}{a_1 q(1+q)} = \frac{1-q+q^r}{q} = \frac{r1}{1r} = \frac{r}{r} \sim rq = r - rq + rq^r$

$\rightarrow rq^r - 10q + r = 0 \rightarrow q = \frac{-(-10) \pm \sqrt{100 - 4(r)(r)}}{r \times r} = \frac{10 \pm \sqrt{4r}}{r} \rightarrow$

$\begin{cases} \frac{11}{r} = r \\ \frac{r}{r} = \frac{1}{r} \end{cases} \Rightarrow \begin{aligned} &\textcircled{1} a_1(1+r^r) = r1 \rightarrow a_1 = 1 \quad 1, r, q, r^2, \dots \\ &\textcircled{2} a_1(1+(\frac{1}{r})^r) = r1 \rightarrow a_1 = r^r \quad r^r, q, r, 1, \dots \end{aligned}$

$\max = r^r$

$$a + aq + aq^r = 11^r$$

$$a \times aq \times aq^r = a^r q^r = (aq)^r = 27$$

سوال (٧)

$$aq = 3 \quad \leftarrow$$

$$\frac{11}{q} + 3 + 3^r q = 11^r \rightarrow \frac{3 + 3^r q}{q} = 10 \rightarrow 3^r q - 10q + 3 = 0$$

$$q = \frac{-(-10) \pm \sqrt{10^2 - 4(3)(3^r)}}{2 \times 3^r} = \frac{10 \pm \sqrt{64}}{6} \begin{cases} \frac{10}{6} = 3 \\ \frac{4}{6} = \frac{2}{3} \end{cases} \left\{ \begin{array}{l} 1, 3, 9 \\ 9, 3, 1 \end{array} \right.$$

$$S_{10} = x \left(\frac{3^{10} - 1}{3 - 1} \right) = 3^{10} - 1 \rightarrow \text{الف}$$

سوال (١)

$$\text{حاصل ضرب: } a^{10} q^{1+2+\dots+9} = a^{10} q^{45} = (a^2 q^9)^5 \rightarrow (4 \times 3^9)^5$$

$$a, aq, aq^r, aq^{r^2}, \dots$$

سوال (٩)

$$(aq - a), (aq^r - aq), (aq^{r^2} - aq^r), \dots$$

$$a_1 = a(q-1) \xrightarrow{\times q} a_r = a(q-1)q \xrightarrow{\times q} a_{r^2} = a(q-1)q^r$$

$$\text{مجموعه} = q/$$

$$\text{الف) } S_n = a_1 + (a_1 + d) + (a_1 + 2d) + \dots + (a_n - 2d) + (a_n - d) + a_n \quad (\text{لذا } S_n)$$

$\overbrace{a_1 + a_n}^{a_1 + a_n}$
 $\underbrace{\quad \quad \quad}_{a_1 + a_n}$
 $a_1 + a_n$

$$S_n = (a_1 + a_n) \times \frac{n}{2} = \frac{n}{2} (a_1 + a_1 + (n-1)d) = \frac{n}{2} (2a_1 + (n-1)d)$$

← متوسطی ضرب

$$\begin{aligned} \text{ب) } & a + \cancel{aq} + \cancel{aq^2} + \dots + \cancel{aq^{n-1}} \rightarrow S_n \\ & - | \cancel{aq} + \cancel{aq^2} + \cancel{aq^3} + \dots + \cancel{aq^n} \rightarrow S_n \times q \end{aligned}$$

$$a - aq^n = S_n - qS_n$$

$$a(1 - q^n) = S_n(1 - q) \rightarrow S_n = a \left(\frac{1 - q^n}{1 - q} \right)$$