

$$\text{الف } q = 2 \quad a_{10} = a_1 q^{n-1} = \frac{1}{2} \times 2^9 = 2^8 = 256$$

$$\text{ب) } \frac{a_{17}}{a_{13}} = q^4 = 2^4 = 16 \quad \text{ج) } b^2 = ac \Rightarrow a_2 a_{10} = b^2 = \frac{1}{2} \times \frac{1}{2} \times 2^8 \times 2^9 = b^2 = 2^8 \Rightarrow b = 2^4 = 16$$

$$\text{د) } 128 = \frac{1}{2} \times 2^{n-1} \Rightarrow 2 = 2^{n-1} \Rightarrow n = 3$$

$$\frac{a_n}{a_5} = q^5 \Rightarrow q^5 = 1 \Rightarrow q = 1 \quad a_{10} = a_1 q^9 \Rightarrow 94 \times 4 = 376$$

$$\text{ان) } \frac{a_{13}}{q^2} \times \frac{a_{17}}{q} \times a_3 \times a_7 q \times a_9 q^2 = 243 \Rightarrow a_3 = 3$$

$$\text{ب) } a_1 \times a_5 = a_3 \times a_7 \Rightarrow a_1 \times a_5 = 9$$

$$\frac{b}{2} \times 2^a = (4\sqrt{2})^2 \Rightarrow 2^{a+b} = 32 = 2^5 \Rightarrow a+b=5 \quad \text{واسطه } = \frac{a+b}{2} = \frac{5}{2} = 2.5$$

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فقط ۱۴ روسته

$$1-x, x, x+1$$

$$1-x^2 = x^2 \Rightarrow 2x^2 = 1 \Rightarrow x^2 = \frac{1}{2} \Rightarrow x = \pm \frac{1}{\sqrt{2}} = \pm \frac{\sqrt{2}}{2}$$

$$\begin{aligned} a+aq^3 &= 28 \Rightarrow a(1+q^3) = 28 \Rightarrow \frac{a(1+q)(q^2-q+1)}{a(1+q)} \cdot \frac{V}{3} \Rightarrow Vq = 3q^2 - 3q + 3 \\ aq+aq^2 &= 12 \Rightarrow aq(1+q) = 12 \end{aligned}$$

$$3q^2 - 10q + 3 = 0 \Rightarrow (q-1)(q-9) = 0 \Rightarrow q < \frac{1}{3}$$

بزرگترین جمله = ۲۷

$$a + aq^3 = 28 \Rightarrow \frac{1}{3} a + 27a = 28 \Rightarrow a_1 = 1, a_4 = 27$$

$$\frac{1}{3} a + \frac{a}{27} = 28 \Rightarrow a_1 = 27, a_4 = 1$$

$$aq + aq^2 = 12 \Rightarrow \frac{1}{3} a + \frac{a}{q} = 12 \Rightarrow a_1 = 27, a_2 = 9, a_3 = 3$$

$$3a + 9a = 12 \Rightarrow a_1 = 1, a_2 = 3, a_3 = 9$$

$$\frac{a_2}{q} \times a_2 \times a_2 q = 27 \Rightarrow a_2 = 3$$

$$\frac{3}{q} + 3q = 10 \Rightarrow 3q^2 - 10q + 3 = 0 \Rightarrow (q-1)(q-9) = 0 \Rightarrow \begin{cases} q=3 \\ q=\frac{1}{3} \end{cases}$$

$$q=3 \rightarrow 1, 3, 9 \quad / \quad q=\frac{1}{3} \rightarrow 9, 3, 1$$

$$\text{ان) } = 2 \left(\frac{1-3^{10}}{2} \right) = 59048$$

$$\text{ب) ضرب } = a_{10} \times q^{40} \Rightarrow 2^{10} \times 2^{40} = 1024 \times (2^7)$$

$$a_r - a_1 = aq - a = a(q-1)$$

$$a_r - a_r = aq^r - aq \cdot aq(q-1)$$

$$a_f - a_r = aq^r - aq^r \cdot aq^r(q-1)$$

$$q = \frac{a_{n+1}}{a_n} = \frac{aq(q-1)}{aq(q-1)} \cdot q \quad \text{④}$$

$$\text{ج) } S_n = \frac{n}{2} (2a + (n-1)d) \quad \text{⑤}$$

$$S_n = a_1 + (a_1 + d) + (a_1 + 2d) + \dots + (a_1 + d(n-1))$$

$$S_n = a_n + a_n - d + a_n - 2d + \dots + (a_1 + d) + a_1$$

$$a_1 + d(n-1) + a_1 + d(n-2) + \dots + a_1 + d + a_1$$

$$2S_n = (2a_1 + (n-1)d) + (2a_1 + (n-1)d) + \dots + \underbrace{\dots}_n$$

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

$$\text{د) } S_n = a_1 + a_r + a_r + \dots + a_n$$

$$S_n = a_1 + a_1q + a_1q^2 + \dots + a_1q^{n-1}$$

$$- \begin{cases} S_n q = a_1q + a_1q^2 + a_1q^3 + \dots + a_1q^n \end{cases}$$

$$S_n q - S_n = a_1q^n - a_1 \Rightarrow S_n = a_1 \left(\frac{q^n - 1}{q - 1} \right)$$