باران مرادی

$a_n = \frac{1}{2}, 1, 2$

$r = 2$

① الف) $256 = a_{10} = \frac{1}{2} \times 2^9 = \boxed{2^8}$

ب) $\frac{a r^{14}}{a r^{10}} = r^4 = 2^4 = \boxed{16}$

ج) $x^2 = 2^8 \times 2^2 \rightarrow x^2 = 2^{10}$

$x = 2^5 = \boxed{32}$

$a_n = \frac{1}{2} r^{n-1} = \frac{32}{\frac{1}{2}}$ ←

$r^{n-1} = 64 = 2^6 \rightarrow \boxed{n = 7}$

د) $a_n = 128 = a_1 r^{n-1}$

$\frac{128}{\frac{1}{2}} = 256 = 2^{n-1} = 2^8$

$\boxed{n = 9}$

② $r^3 = \frac{a_8}{a_5} = \frac{96}{12} = 8 \rightarrow r = 2$

$a_{10} = a_8 r^2 = 96 \times 4 = \boxed{384}$

③ $P_5 = (a_3)^5 = 243 = 3^5$

الف) $\boxed{a_3 = 3}$

ب) $a_1 a_5 = a_2 a_4 = a_3 a_3$

$a_1 a_5 = 3 \times 3 = \boxed{9}$

④ $16 \times 2 \leftarrow (4\sqrt{2})^2 = 2^a \times 2^b$

$32 = 2^{a+b} \rightarrow a+b = 5$

واسطه حسابی $= \frac{a+b}{2} = \frac{5}{2} = \boxed{2/5}$

⑤ $(1-x)(1+x) = x^2 \rightarrow 1^2 - x^2 = x$

$\frac{2x^2}{2} = \frac{1}{2} \rightarrow \boxed{x = \pm\sqrt{\frac{1}{2}}}$

⑥ $a_1 + a_4 = 28 \rightarrow a(1+r^3)$

$a_2 + a_3 = 12 \rightarrow ar(1+r)$

$\rightarrow \frac{a(1+r^3)}{ar(1+r)} = \frac{\cancel{(1+r)}(1-r+r^2)}{r\cancel{(1+r)}} = \frac{7}{3}$

$3 - 3r + 3r^2 = 7r$

$3r^2 - 10r + 3 = 0$

$r^2 - 10r + 9 = 0$

$(r-1)(r-9) = 0$

$r = \frac{1}{3} \quad , r = 3$

$r = 3 \rightarrow a(1+27) = 28 \rightarrow a = 1$ ✓

$r = \frac{1}{3} \rightarrow a(\cancel{1 + \frac{1}{27}}) = 12 \rightarrow a = \frac{81}{7}$ ✗

$a_1 + a_4 = 1 + (27) = 28$ ✓

$a_2 + a_3 = 3 + 9 = 12$

$a_1 + a_4 = \frac{81}{7} + \frac{81}{7} \times \frac{1}{27} = \frac{84}{7} = 12$ ✗

$a_2 + a_3 =$ ✗

ادامه سؤال ۶ :

$a=1 \quad r=3$

$a_3 = ar^2$

$a_3 = 9$

$a_4 = ar^3$

$\boxed{a_4 = 27}$

(۷)

$a_1 + a_2 + a_3 = 13 \rightarrow a_1 + a_3 = 10$

$a_1 a_2 a_3 = 27 \rightarrow$

$P_3 = a_2^3 = 27$

$\boxed{a_2 = 3}$

$\frac{3}{r} + 3r = 10$

$3 + 3r^2 = 10r$

$3r^2 - 10r + 3 = 0$

$r^2 - 10r + 9 = 0 \rightarrow (r-9)(r-1) \rightarrow r = \frac{9}{3} = 3 ,\ r = \frac{1}{3}$

$r=3 \rightarrow a_1 = \frac{3}{3} = 1 \ / \ a_3 = 3 \times 3 = 9 \longrightarrow \boxed{1, 3, 9}$

$r = \frac{1}{3} \rightarrow a_1 = 9 \ / \ a_3 = 1 \longrightarrow \boxed{9, 3, 1}$

(۸)

$a_n = 2, 6, 18, \text{—} \rightarrow r = 3$

$a_{10} = 2 \times 3^9$

$S_{10} = a_1 \left(\frac{q^{10}-1}{q-1}\right) = \cancel{2} \times \left(\frac{3^{10}-1}{\cancel{2}}\right) = 3^{10} - 1$

$P_{10} = \sqrt{(a_1 a_{10})^{10}} = (a a_{10})^5 = (2 \times 2 \times 3^9)^5$

$\boxed{= 4^5 \times 3^{45}}$

(۹)

$a, aq, aq^2, \text{—}, aq^{n-1}$

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

$aq - aq^2 = aq(1-q)$

$aq^2 - aq^3 = aq^2(1-q)$

$\vdots$

قدر نسبت $= q$

جمله اول $= a(1-q) = a - aq$

(۱۰)

الف) $a + ad + a2d + a + 3d + \text{—} + a + (n-1)d$

$na + \frac{n}{2} \times (n-1)d \rightarrow na + \frac{n^2 d - nd}{2} = na + \frac{n}{2}(n-1)d$

$\frac{n}{2}(2a + (n-1)d)$

ب)

$$-\begin{cases} S_n = a + \cancel{ar} + \cancel{ar^2} + \text{—} + \cancel{ar^{n-1}} \\ rS_n = \cancel{ar} + \cancel{ar^2} + \cancel{ar^3} + \text{—} + \cancel{ar^{n-1}} + ar^n \end{cases}$$

$S_n - rS_n = a - ar^n$

$S_n \cancel{(1-r)} = \frac{a(1-r^n)}{(1-r)} \longrightarrow S_n = a\left(\frac{1-r^n}{1-r}\right)$