

$$\frac{1}{r}, 1, r, r^2, \dots \quad a_n = ar^{n-1} = \frac{1}{r} \cdot (r)^{n-1} \quad (1)$$

$$r=2 \quad a_{10} = \frac{1}{2} \cdot (2)^9 = 256 \quad \text{(الف)}$$

$$\frac{a_{14}}{a_{13}} = \frac{r^{14-13}}{r^{13-13}} = r^1 = 2 = 2 \quad \text{(ب)}$$

(ج)

$$\frac{1}{r} \cdot (r)^{n-1} = 121 \Rightarrow r^{n-1} = 121 = 2^1 \Rightarrow 1 = n-1 \Rightarrow \boxed{n=2} \quad \text{(د)}$$

$$\frac{a_1}{a_4} = \frac{r^1}{r^4} = r^{-3} = \frac{9}{12} = \frac{3}{4} \Rightarrow \boxed{r=2} \quad \text{(ه)}$$

$$\boxed{a = \frac{r}{r}} \quad a_{10} = \frac{r}{r} \cdot (r)^9 = 2^9 = 512$$

$$a_n = \frac{r}{r} \cdot (r)^{n-1}$$

$$(b^r)^n = p_n \Rightarrow (a_r)^n = 2^r \Rightarrow \underline{a_r = 2} \quad \text{(الف)}$$

$$a_1 \times a_8 = (a_r)^9 \Rightarrow a_1 \times a_8 = r^9 = 9 \quad \text{(ب)}$$

$$b^r = ac \Rightarrow (r\sqrt{r})^r = r^a \times r^b = r^d = r^r$$

$$\Rightarrow a+b=d \Rightarrow \frac{a+b}{r} = \frac{d}{r} \Rightarrow \underline{\frac{d}{r} = 2} \quad \text{(ج)}$$

$$a_n = 1-x = ar^r \quad (1-x)(x+1) = x^r$$

$$a_1 = ar^1 = x \quad x + 1 - x^r - x = x^r$$

$$a_{11} = ar^{10} = x+1 \quad 1 - x^r = x^r$$

$$1 = 2x^r \Rightarrow x^r = \frac{1}{2} \Rightarrow \underline{x = \pm \sqrt[r]{\frac{1}{2}}}$$

$$a_1 + a_r = 11 \Rightarrow a + ar^r = 11 \Rightarrow a(1+r^r) = 11 \quad (9)$$

$$a_r + a_{r^2} = 12 \Rightarrow ar + ar^2 = 12 \Rightarrow ar(1+r) = 12$$

$$\frac{ar(1+r)}{a(1+r)(1+r^r-r)} = \frac{12}{11} = \frac{r}{1+r} \Rightarrow 1+r = r + \frac{r^2}{1+r} \Rightarrow \frac{r^2}{1+r} = 1 \Rightarrow r^2 = 1+r$$

$$\Delta = 100 - F(r)(M) = 25 \Rightarrow \frac{100-1}{r} = \left(\frac{100}{r}\right) \left(\frac{1}{r}\right) \Rightarrow \frac{r-r^2}{a-1} \Rightarrow ar^r = 25 \quad (V)$$

$$a_1 \cdot a_r \cdot a_{r^2} = 25 \Rightarrow (a_r)^r = 25 \Rightarrow a_r = 5$$

$$(a_r)^r = a_1 \cdot a_{r^2} \Rightarrow \frac{25}{r} = a_1 \cdot a_{r^2} = 9 \Rightarrow r = 5 \Rightarrow a_1 = 1, a_{r^2} = 9$$

$$r, r^2, r^3, \dots \quad S_n = a \left(\frac{r^n - 1}{r - 1} \right) \quad (1)$$

$$S_{10} = 4 \left(\frac{5^{10} - 1}{5 - 1} \right) = 490496 \quad (\text{الف})$$

$$P_{10} = \sqrt{(a_1 \times a_{10})^{10}} = \sqrt{(1 \times 937500)^{10}} = (937500)^{5} \quad (\text{ب})$$

$$P_n = \sqrt{(a_1 \cdot a_n)^n} \quad a_{10} = ar^9 = 2(5)^9 = 937500$$

$$a_n = ar^{n-1} \quad q = r$$

$$ar^n - ar^{n-1} = b_n \Rightarrow ar^{n-1}(r-1) = b_n \Rightarrow b_{n+1} = ar^n(r-1)$$

$$\frac{b_{n+1}}{b_n} = \frac{ar^n(r-1)}{ar^{n-1}(r-1)} = r$$

$$a, a+d, a+2d, \dots, a+(n-1)d \Rightarrow \text{مجموع} = \text{تعداد} \times \text{میانگین} \Rightarrow \frac{n}{2} (2a + (n-1)d) \quad (10)$$

$$n \times \left(\frac{a + a + (n-1)d}{2} \right) = \frac{n}{2} (2a + (n-1)d)$$

$$S_n = a, ar, ar^2, \dots, ar^{(n-1)}$$

$$S_n = ar, ar^2, \dots, ar^n \Rightarrow S_n - S_r = a - ar^n \Rightarrow S_n(1-r) = a(1-r^n) \Rightarrow S_n = \frac{a(1-r^n)}{1-r} = \frac{a(r^n-1)}{r-1} \quad (\text{ب})$$