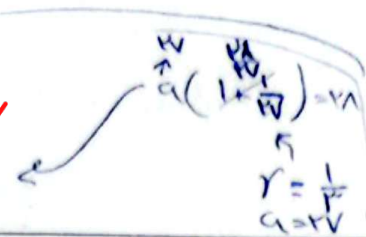
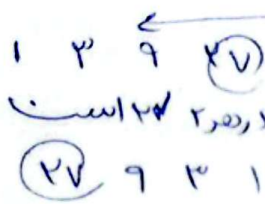


$$a_1 + ar^k = PA \rightarrow a + ar^k = PA \rightarrow a(1+r^k) = PA$$

$$a_1 + ar^k = 1P \rightarrow a + ar^k = 1P \rightarrow a(r(1+r)) = 1P$$

$$\frac{1+r^k}{r(1+r)} = \frac{PA}{1P}$$



$$1P + 1P^2 = PA + PV + PV^2$$

$$1P^2 - PV^2 = PA^2 - PV^2$$

$$1P^2 - PV^2 - PV^2 + PV = 0$$

(2)

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$$a_1 + ar^k = 1P$$

$$a + ar^k = PV \rightarrow a + ar^k = PV \rightarrow a(1+r^k) = PV \rightarrow ar = P$$

$$a = \frac{P}{r}, ar = P \rightarrow ar^k = P^k$$

$$\frac{P}{r} + P^k = 1P$$

$$\frac{1}{r} + 1 + r^k = \frac{1P}{P}$$

$$\frac{1}{r} - \frac{1}{ar} = \dots$$

$$r = \frac{P}{a} \rightarrow 1, P, q$$

$$r = \frac{P}{a} \rightarrow q, P, q$$

$$q \rightarrow \frac{1}{r} = \dots$$

$$a_1 + ar^k = - (1 - r^k) \leftarrow P \left(\frac{1 - r^k}{1 - r} \right) \leftarrow P \left(\frac{1 - r^k}{1 - r} \right)$$

(2)

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(2)

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$$(P \times r^k)^n \leftarrow (P \times r^k)^n \leftarrow (a \cdot r^k)^n$$

$$a_1 = P$$

$$a_1 = P, r = \dots$$

$$a_n = aq^{n-1}$$

$$d_n = a_{n+1} - a_n$$

$$d_n = aq^n - aq^{n-1} = a(q-1)q^{n-1}$$

$$\frac{d_{n+1}}{d_n} = \frac{a(q-1)q^n}{a(q-1)q^{n-1}} = q$$

$$q = 1 + r$$

$$0 = d_n$$

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$$a, a+d, a+2d, \dots, a+(n-1)d \rightarrow \dots$$

$$a_n + (d(n-1)) \rightarrow \dots$$

$$a, aq, aq^2, \dots, aq^{n-1} \rightarrow \dots$$

$$S_n - 1S_n = a - aq^n \rightarrow S_n(1-q) = a(1-q^n) \rightarrow$$

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

(2)

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الف) $\frac{1}{x^2} \cdot \frac{1}{x^2} \rightarrow \frac{1}{x^4} \rightarrow \frac{1}{x^4} \rightarrow \frac{1}{x^4} \rightarrow 2^4 \rightarrow 16$ ✓ (۲)

ب) $\frac{a_{10}}{a_{11}} = \frac{1}{q} \rightarrow q = 2 \rightarrow 2^9 \rightarrow 512$ ✓ (۲)

ج) $a_1 a_2 a_3 \rightarrow 1 \times 2 \times 4 \rightarrow 8 \rightarrow \sqrt{8} = 2\sqrt{2}$ ✓ $ac = b^2$

د) $128 = \frac{1}{2} r^{n-1} \rightarrow 256 = r^{n-1} \rightarrow r^{n-1} = 256 \rightarrow n = 9$ ✓ (۲)

$a_{10} = 12$ $\frac{a_9}{12} = 2 = q \rightarrow q = 2$

$a_{11} = 24$

$a_{11} \times q^2 = a_{10}$

$24 \times 2 = 48$ ✓ (۲)

$a_1 a_2 a_3 a_4 a_5 = 243$

$a_1 r^0 = 243$

$a_1 r^4 = \frac{243}{r^4}$

$a_1 r^4 = a_1 r^0$

$(a_1 r^4)^2 = 243^2$ ✓ (۲)

$c = \frac{a+b}{2}$

$\frac{a+b}{2} = \frac{a+b}{2}$

$c = \frac{a+b}{2}$ ✓ (۲)

$q^2 a_{11} = 1 - a$

$q^2 a_{12} = a$

$a_{11} = a + 1$

$a_{11}^2 = a_{10} a_{12}$

$x^2 = (1-a)(1+a)$

$x^2 = 1 - a^2$

$1 - x^2 = 1 - a^2 \rightarrow x^2 = a^2 \rightarrow a = \frac{1}{\sqrt{2}}$ ✓ (۲)