

الف) $aq^{n-1} = \frac{1}{2} \times 2^9 = 256$ ب) $\frac{a_{17}}{a_{13}} = q^4 = 2^4 = 16$

ج) $a_8 \times a_{11} = a_9^2 \Rightarrow aq^7 \times aq^{10} = a^2 q^{17} \Rightarrow \sqrt{a^2 q^{17}} = aq^8 = a_{17}$

د) $127 = aq^{n-1} \Rightarrow \frac{1}{2} \times 2^{n-1} = 127 \Rightarrow n = 9$

$\frac{a_1}{a_5} = q^4 = 1 \Rightarrow q = 1$ $a \times 2^4 = 12 \Rightarrow a = \frac{12}{16} = \frac{3}{4}$

$\frac{3}{4} \times 2^9 = 315$

الف) $a_5 = 2 \times 3 \Rightarrow a_3 = 3$

ب) $a_1 \times a_9 = a_5^2 \Rightarrow a_1 \times a_9 = 9$

$2^a \times 2^b = (2\sqrt{2})^c \Rightarrow 2^a \times 2^b = 2^c \times 2^{\frac{c}{2}} \Rightarrow 2^{a+b} = 2^{\frac{3c}{2}} \Rightarrow a+b = \frac{3c}{2}$

$\Rightarrow \frac{a+b}{c} = \frac{3}{2} = 1.5$

$x^2 = (x+1)(1-x) \Rightarrow x^2 = x - x^2 + 1 - x \Rightarrow 2x^2 = 1 \Rightarrow x^2 = \frac{1}{2} \Rightarrow x = \sqrt{\frac{1}{2}}$

$$\cancel{a_1} a_1 + a a^r = 11 \Rightarrow \frac{a(1+q^r)}{a(q+q^r)} = \frac{11}{12}$$

$$aq + aq^r = 12$$

$$\frac{1+q^r}{q+q^r} = \frac{11}{12} \Rightarrow q = \frac{1}{r}, a = 12$$

$$1, 12, 9, 12$$

$$12, 9, 12, 1$$

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$$a_1 + a_2 + a_3 = 13$$

$$a_1 \times a_2 \times a_3 = 12 \Rightarrow a_2^r = 12 \Rightarrow a_2 = 3 \left. \begin{array}{l} a_1 + a_3 = 10 \end{array} \right\}$$

$$\Rightarrow a_1 = 1$$

$$a_3 = 9$$

$$1, 3, 9$$

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$$\text{اف) } 2 \left(\frac{r^5 - 1}{r - 1} \right) = r^5 - 1$$

$$\text{ب) } (a_1 \times a_2)^5 \Rightarrow (a_1 \times a_2 \times q^4)^5 \Rightarrow (r \times r^4)^5$$

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$$a, aq, aq^2 \Rightarrow aq - a = a(q-1) \downarrow \times q$$

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

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$$S_n = \frac{n}{r} (a_1 + a_n) \Rightarrow \frac{n}{r} (a + a + (n-1)d) \Rightarrow \frac{n}{r} (a + a_n) \Rightarrow S_n = \frac{(a + a_n) + (d_1 + d_{n-1})}{2} \times \frac{n}{r}$$

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

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$$a + aq + aq^2 + \dots + aq^{n-1} = a(1 + q + q^2 + \dots + q^{n-1}) \times \frac{q-1}{q-1} = a \left(\frac{q^n - 1}{q - 1} \right)$$