

۱

... و $\{1, 2, 3, \dots, n\}$...

$$\left. \begin{aligned} \text{عدد اول} &= (n-1) + 1 = 64 + 1 = \boxed{65} \\ \text{عدد آخر} &= n^2 = \boxed{11} \end{aligned} \right\} \Rightarrow \text{مجموعه} = \frac{11+65}{2} = 38$$

۲

$1, 2, 3, \dots, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100$

$$\frac{1+100}{2} = 50.5$$

۳

$$S_1 = \frac{1+100}{2} + \frac{101+200}{2} + \frac{201+300}{2} + 1 = 10 + 150 = 160$$

$$a_1 + a_2 + \dots + a_{100} = \frac{1+100}{2} \cdot 100 = 5050$$

۴

$a_n = an + b$ $a_0 = 15$ $a_1 = 17$
 $a = \frac{1}{1} (17 - 15) = 2$
 $a_0 = -\frac{1}{0} + b = 15 \Rightarrow b = 15$
 $a_1 = -\frac{1}{1} + b + c = 17 \Rightarrow b + c = 18$
 $b + c = 18$
 $c = 18 - b = 18 - 15 = 3$
 $b = 15$
 $c = 3$
 $a_0 = 15$
 $a_1 = 17$
 $a_2 = 19$
 $a_3 = 21$
 $a_4 = 23$
 $a_5 = 25$
 $a_6 = 27$
 $a_7 = 29$
 $a_8 = 31$
 $a_9 = 33$
 $a_{10} = 35$
 $a_{11} = 37$
 $a_{12} = 39$
 $a_{13} = 41$
 $a_{14} = 43$
 $a_{15} = 45$
 $a_{16} = 47$
 $a_{17} = 49$
 $a_{18} = 51$
 $a_{19} = 53$
 $a_{20} = 55$
 $a_{21} = 57$
 $a_{22} = 59$
 $a_{23} = 61$
 $a_{24} = 63$
 $a_{25} = 65$
 $a_{26} = 67$
 $a_{27} = 69$
 $a_{28} = 71$
 $a_{29} = 73$
 $a_{30} = 75$
 $a_{31} = 77$
 $a_{32} = 79$
 $a_{33} = 81$
 $a_{34} = 83$
 $a_{35} = 85$
 $a_{36} = 87$
 $a_{37} = 89$
 $a_{38} = 91$
 $a_{39} = 93$
 $a_{40} = 95$
 $a_{41} = 97$
 $a_{42} = 99$
 $a_{43} = 101$
 $a_{44} = 103$
 $a_{45} = 105$
 $a_{46} = 107$
 $a_{47} = 109$
 $a_{48} = 111$
 $a_{49} = 113$
 $a_{50} = 115$
 $a_{51} = 117$
 $a_{52} = 119$
 $a_{53} = 121$
 $a_{54} = 123$
 $a_{55} = 125$
 $a_{56} = 127$
 $a_{57} = 129$
 $a_{58} = 131$
 $a_{59} = 133$
 $a_{60} = 135$
 $a_{61} = 137$
 $a_{62} = 139$
 $a_{63} = 141$
 $a_{64} = 143$
 $a_{65} = 145$
 $a_{66} = 147$
 $a_{67} = 149$
 $a_{68} = 151$
 $a_{69} = 153$
 $a_{70} = 155$
 $a_{71} = 157$
 $a_{72} = 159$
 $a_{73} = 161$
 $a_{74} = 163$
 $a_{75} = 165$
 $a_{76} = 167$
 $a_{77} = 169$
 $a_{78} = 171$
 $a_{79} = 173$
 $a_{80} = 175$
 $a_{81} = 177$
 $a_{82} = 179$
 $a_{83} = 181$
 $a_{84} = 183$
 $a_{85} = 185$
 $a_{86} = 187$
 $a_{87} = 189$
 $a_{88} = 191$
 $a_{89} = 193$
 $a_{90} = 195$
 $a_{91} = 197$
 $a_{92} = 199$
 $a_{93} = 201$
 $a_{94} = 203$
 $a_{95} = 205$
 $a_{96} = 207$
 $a_{97} = 209$
 $a_{98} = 211$
 $a_{99} = 213$

۵

$a_1 = a_0 + d$
 $a_2 = a_1 + d$
 $a_3 = a_2 + d$
 $a_4 = a_3 + d$
 $a_5 = a_4 + d$
 $a_6 = a_5 + d$
 $a_7 = a_6 + d$
 $a_8 = a_7 + d$
 $a_9 = a_8 + d$
 $a_{10} = a_9 + d$
 $a_{11} = a_{10} + d$
 $a_{12} = a_{11} + d$
 $a_{13} = a_{12} + d$
 $a_{14} = a_{13} + d$
 $a_{15} = a_{14} + d$
 $a_{16} = a_{15} + d$
 $a_{17} = a_{16} + d$
 $a_{18} = a_{17} + d$
 $a_{19} = a_{18} + d$
 $a_{20} = a_{19} + d$
 $a_{21} = a_{20} + d$
 $a_{22} = a_{21} + d$
 $a_{23} = a_{22} + d$
 $a_{24} = a_{23} + d$
 $a_{25} = a_{24} + d$
 $a_{26} = a_{25} + d$
 $a_{27} = a_{26} + d$
 $a_{28} = a_{27} + d$
 $a_{29} = a_{28} + d$
 $a_{30} = a_{29} + d$
 $a_{31} = a_{30} + d$
 $a_{32} = a_{31} + d$
 $a_{33} = a_{32} + d$
 $a_{34} = a_{33} + d$
 $a_{35} = a_{34} + d$
 $a_{36} = a_{35} + d$
 $a_{37} = a_{36} + d$
 $a_{38} = a_{37} + d$
 $a_{39} = a_{38} + d$
 $a_{40} = a_{39} + d$
 $a_{41} = a_{40} + d$
 $a_{42} = a_{41} + d$
 $a_{43} = a_{42} + d$
 $a_{44} = a_{43} + d$
 $a_{45} = a_{44} + d$
 $a_{46} = a_{45} + d$
 $a_{47} = a_{46} + d$
 $a_{48} = a_{47} + d$
 $a_{49} = a_{48} + d$
 $a_{50} = a_{49} + d$
 $a_{51} = a_{50} + d$
 $a_{52} = a_{51} + d$
 $a_{53} = a_{52} + d$
 $a_{54} = a_{53} + d$
 $a_{55} = a_{54} + d$
 $a_{56} = a_{55} + d$
 $a_{57} = a_{56} + d$
 $a_{58} = a_{57} + d$
 $a_{59} = a_{58} + d$
 $a_{60} = a_{59} + d$
 $a_{61} = a_{60} + d$
 $a_{62} = a_{61} + d$
 $a_{63} = a_{62} + d$
 $a_{64} = a_{63} + d$
 $a_{65} = a_{64} + d$
 $a_{66} = a_{65} + d$
 $a_{67} = a_{66} + d$
 $a_{68} = a_{67} + d$
 $a_{69} = a_{68} + d$
 $a_{70} = a_{69} + d$
 $a_{71} = a_{70} + d$
 $a_{72} = a_{71} + d$
 $a_{73} = a_{72} + d$
 $a_{74} = a_{73} + d$
 $a_{75} = a_{74} + d$
 $a_{76} = a_{75} + d$
 $a_{77} = a_{76} + d$
 $a_{78} = a_{77} + d$
 $a_{79} = a_{78} + d$
 $a_{80} = a_{79} + d$
 $a_{81} = a_{80} + d$
 $a_{82} = a_{81} + d$
 $a_{83} = a_{82} + d$
 $a_{84} = a_{83} + d$
 $a_{85} = a_{84} + d$
 $a_{86} = a_{85} + d$
 $a_{87} = a_{86} + d$
 $a_{88} = a_{87} + d$
 $a_{89} = a_{88} + d$
 $a_{90} = a_{89} + d$
 $a_{91} = a_{90} + d$
 $a_{92} = a_{91} + d$
 $a_{93} = a_{92} + d$
 $a_{94} = a_{93} + d$
 $a_{95} = a_{94} + d$
 $a_{96} = a_{95} + d$
 $a_{97} = a_{96} + d$
 $a_{98} = a_{97} + d$
 $a_{99} = a_{98} + d$

$$\gamma(a+d)^r = \phi(a+d)(a) + r(a+d)(a)$$

$$\gamma a^r + r a d + \gamma d^r = \phi a^r + r a d + r a^r + \gamma d^r$$

$$\gamma a^r + r a d - \gamma d^r = .$$

$$\sigma \Rightarrow \frac{a}{\epsilon} \downarrow$$

$$a^r + a d - r a d = .$$

$$(a + \frac{a}{\epsilon})(a - \frac{a}{\epsilon}) \Rightarrow a = \frac{a^2}{\epsilon} = \frac{\epsilon d^r}{\epsilon} = \epsilon d^r$$

$$r b = c + a \Rightarrow a = r b - c$$

$$\frac{a^r}{\epsilon} = \frac{b c}{\epsilon} \Rightarrow a^r = b c$$

$$\left. \begin{aligned} (r b - c)^r &= \epsilon b^r - \epsilon b c + c^r = b c \\ \sigma \Rightarrow \epsilon b^r - \epsilon b c + c^r &= . \\ b^r - \sigma b c + \epsilon c^r &= . \end{aligned} \right\} \Rightarrow$$

$$(b - \frac{b}{\epsilon})(b - \frac{b}{\epsilon}) = \frac{b^2}{\epsilon} - \frac{b^2}{\epsilon} + \frac{b^2}{\epsilon} = \frac{b^2}{\epsilon} = \frac{1}{\epsilon} c$$

$$a_n: \frac{1}{\epsilon} c, \frac{a}{\epsilon}, \frac{c}{\epsilon}$$

$$\frac{c^r}{\epsilon} = \frac{a^r}{\epsilon} \Rightarrow c = \pm a$$

$$\begin{aligned} q = -1 &\Rightarrow r = -2 \\ q = 1 &\Rightarrow r = 2 \end{aligned}$$

$$\epsilon a = r b c$$

$$a = b q = c q^r$$

$$\left. \begin{aligned} \epsilon a &= r b c \\ a &= b q = c q^r \end{aligned} \right\} \Rightarrow \frac{c + r(c q)}{r} = r q^r \Rightarrow \epsilon c q^r = c + r c q$$

$$\epsilon q^r = 1 + r q \Rightarrow q = -\frac{1}{\epsilon}$$

$$\frac{a q}{a q} = q^r = \boxed{-\frac{1}{\epsilon}}$$

$$\frac{a q}{a q} + \frac{a q^r}{a q^r} = \frac{q}{a} + \frac{q^r}{a^r} = r$$

$$\frac{q}{a} + \left(\frac{q}{a}\right)^r = r \Rightarrow \frac{q}{a} = \frac{q^r}{a^r} = 1$$

$$\frac{a^r}{a^r} = \frac{a a}{a q} = \boxed{1}$$

$$a_r = \sqrt{a \epsilon} = \sqrt{a r q} \Rightarrow a_r = q$$

$$a_d = a q^r = 1 \times q^r = r \Rightarrow q = r$$

$$\boxed{a = \frac{1}{r}}$$

$$\frac{1}{r} - \frac{1}{r} = \boxed{\frac{1}{\epsilon}}$$