

$$E_n = \underbrace{1, 9, 17, \dots}_{\text{ف}}$$

$$a_n = \boxed{4n + 1} \quad (\text{الف})$$

$$a_{10} = 4(10) + 1 = \boxed{41} \quad (\text{ب})$$

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$$E_n = \underbrace{(1, 9, 17, \dots)}_{\text{ف}} \rightarrow a_n = 4n + 1 \rightarrow \underline{d = 4}$$

$$\text{الف) } S_1 = \frac{10}{4} \left(\cancel{1 \times 4} + \cancel{9 \times 4} \right) = \boxed{140}$$

$$\text{ب) } S = a_{19} + a_{18} + a_{17} + a_{16} = \frac{4}{4} \left(\cancel{1 \times 4} + \cancel{9 \times 4} \right) = \boxed{494}$$

$\rightarrow 4(19) + 1 = 111$

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$$E_n = \underbrace{1 + \sqrt{e}}_{1 - \sqrt{e}}, \underbrace{2}_{1 - \sqrt{e}}, \underbrace{3 - \sqrt{e}}_{1 - \sqrt{e}}, \dots \rightarrow d = 1 - \sqrt{e}$$

$$a_{18} - a_{17} = r d = r(1 - \sqrt{e}) = \boxed{1 - 2\sqrt{e}} \quad (\text{ج})$$

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$$a_n = \underbrace{d^{rn}}_{+ 2 \times d^{rn}}, \underbrace{r \times d^{rn}}_{+ 2 \times d^{rn}}, d^y \rightarrow (r+2) \times d^{rn} = d^{r(n+1)} = d^y \rightarrow \underline{y = r(n+1)}$$

$$b_n = n, 2, y \rightarrow x + y = 4 \rightarrow \underline{y = 4 - n}$$

$\begin{cases} y = r(n+1) \\ y = 4 - n \end{cases} \rightarrow r(n+1) = 4 - n \rightarrow rn + r = 4 - n \rightarrow rn + n = 4 - r \rightarrow n(r+1) = 4 - r$

$$rn + 1 = 4 - n \rightarrow rn + n = 4 - r \rightarrow n(r+1) = 4 - r$$

$\rightarrow n = 1 \rightarrow y = 3$

$\rightarrow xy = 1 \times 3 = \boxed{3} \quad (\text{د})$

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$$E_n = \underbrace{2n - 1}_{+ 2}, \underbrace{2n - 1}_{\varepsilon n + 1}, 4n, \dots \rightarrow d = 2 = \varepsilon n + 1 \rightarrow n = 0.5$$

$$a_1 = 2n - 1 = 1 - \varepsilon = \underline{3} \rightarrow a_\varepsilon = a_1 + r d = -3 + 9 = \boxed{6} \quad (\text{ه})$$

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$$a_n = r, \textcircled{2}, V, 9, \textcircled{11}, 10, \dots \rightarrow a_n = r_{n+1} \rightarrow a_{10} = \underline{\underline{11}}$$

$$b_n = r, \textcircled{2}, \textcircled{11}, 10, 19, 18, \dots \rightarrow b_n = r_{n+1} \rightarrow a_{10} = \underline{\underline{11}}$$

$$C_n = C_{n-1} \rightarrow \begin{matrix} C_{n-1} \leq 11 \\ C_n \leq 19 \\ n \leq V \end{matrix} \quad V-1+1 = \boxed{V} \quad \therefore 6$$

$$r a_1 + r d = r1 \rightarrow a_1 + d = V = a_r \rightarrow d = r1 \rightarrow a_1 = V - r1 = \underline{\underline{-11}}$$

$$r a_1 + 9d = 108 \rightarrow a_1 + 9d = 108 = a_c$$

$$\frac{a_c - a_r + a_1}{a_1} = \frac{r d - V + (-r1)}{-r1} = \frac{V}{-r1} = \boxed{-\frac{1}{r}} \quad \therefore V$$

$$(a_r - d) + a_r + (a_r + d) = 108 \rightarrow a_r = 36$$

$$a_c + a_8 = 108 \rightarrow (a_c - d) + a_c + (a_c + d) + (a_c + r d) = 108$$

$$\rightarrow 4a_c = 108 \rightarrow a_c = 27 \rightarrow d = \frac{108 - 4a_c}{4} = 9$$

$$a_r = 36 = a_{10} \rightarrow a_n = r_{n+1} \rightarrow a_{10} = r_{10} - 1 = \boxed{39}$$

$$a_{10} = 1(10)$$

$$9(a_1 + 9d) = 9 \times r(a_1 + d)$$

$$9a_1 + 81d = r a_1 + r d$$

$$9d = 19a_1 \rightarrow d = \frac{19a_1}{9}$$

$$\frac{a_{10}}{a_1} = \frac{a_1 + 19d}{a_1 + 9d} = \frac{a_1 + 19 \times \frac{19a_1}{9}}{a_1 + 19 \times \frac{19a_1}{9}} = \frac{19a_1}{19a_1} = \boxed{19}$$

$$a_n \rightarrow a_1 = 11, a_V = 108 \rightarrow d = \frac{108 - 11}{V - 1} = \frac{97}{4} = 24.25 \rightarrow a_n = 11 + n \times 24.25$$

$$f_{n+V} \rightarrow 11(11) + V = 121 = b_1 + r d_r$$

$$121 = 11 + 10d_r$$

$$-10 = 10d_r \rightarrow d_r = -1$$

$$\text{نسبت واسطه} = \frac{121 - 11}{-10} - 1 = d - 1 = \boxed{-12}$$

این پرسش با این فرض حل شد که منظور از جمله چهارم، جمله چهارم دنباله است و نه چهارمین واسطه.