

$$a_1 = 10, a_5 = 41 \rightarrow d = \frac{41 - 10}{5 - 1} = 7.5 \rightarrow a_n = a + d(n-1) = 10 + 7.5(n-1) = 7.5n + 2.5 \rightarrow 7.5n + 2.5 = 101 \rightarrow 7.5n = 98.5 \rightarrow n = 13.13 \rightarrow n = 14$$

$$\rightarrow 7n = 14 \rightarrow n = 2$$

$$V \times 15 + 101 = 101 \rightarrow 101, 108, \dots, 99V \rightarrow \frac{99V - 101}{V} + 1 = 129$$

$$a_{n+1} + a_{n+2} + a_{n+3} = -4 + 12 \rightarrow 3a + 3(n+1)d = -4n + 12 \rightarrow a + (n+1)d = -\frac{4}{3}n + 4$$

$$\rightarrow a + nd + d = -\frac{4}{3}n + 4 \rightarrow nd = -\frac{4}{3}n + 4 - a \rightarrow d = -\frac{4}{3}, a + d = 4 \rightarrow a - \frac{4}{3} = 4 \rightarrow a = \frac{16}{3}$$

$$\rightarrow a_{14} + a_n = 2a + 2nd = 2 \times \frac{16}{3} + 2 \times (-\frac{4}{3}) = \frac{32}{3} - \frac{8}{3} = \frac{24}{3} = 8$$

$$a_r = r^n - 1 \quad r^n - 10^4 = r^{n+1} \rightarrow rd = \frac{1}{r} = r^n(r-1)$$

$$a_n = r^{n+1} = a_r + rd \rightarrow rd = r^n + 1$$

$$a_{10} = r^{10} - 1 = a_1 + rd \quad r^{10} - 1 = r + r^n + 1 \rightarrow r^{10} = r^{n+1} + r + 2$$

$$\rightarrow r^n(r^n - r - 1) = 2 \rightarrow r^n = y \rightarrow y(y - r) = 2$$

$$\rightarrow y^2 - ry - 2 = 0 \rightarrow (y - 2)(y + 1) = 0 \rightarrow y = 2 \text{ or } y = -1$$

$$r + 1 + 1 = 2 \rightarrow r = 0, 1, 1 \rightarrow n = 2 \rightarrow y = 2 = r^n$$

$$\frac{a_{10}}{10} - \frac{a_1}{1} = a + 9d - a - 1d = 8 \rightarrow d = -\frac{8}{8} = -1$$

$$a_{11} + a_{10} = 1 + 9d + a + 1d = 1 + 10d = 1 + 10(-1) = -9 \rightarrow 1 + 10d = -9 \rightarrow 10d = -10 \rightarrow d = -1$$

$$a_{11} = a + 10d = 1 + 10(-1) = -9$$

$$a_1 + a_2 + a_3 + a_4 + a_5 = \frac{1}{5} (a_1 + a_2 + a_3 + a_4 + a_5)$$

(4)

$$\omega_{n+1} d = \frac{1}{r} (\omega_n + \omega_{n+1} d) = \frac{1}{r} \omega_n + \frac{r}{r} d \rightarrow \frac{1}{r} \omega_n = \frac{1}{r} d \rightarrow \omega_n = d$$

$$\rightarrow \frac{a_r}{a} = \frac{a+d}{a} = \frac{\frac{1}{r}d + d}{\frac{1}{r}d} = \frac{r+1}{1} = \boxed{r}$$

(V)

$$t_n = t_{n-1} + 1 = t_n \cdot r + 1 \rightarrow r = 1 \rightarrow d = 1$$

$$\frac{t_q^r - t_0^r}{t_v} = \frac{(t_q - t_0)(t_q + t_0)}{t_v} = \frac{r d (r t_0)}{t_v} = r_0 \times r = \boxed{r_0}$$

$$\frac{r+r-4r}{1r} = \frac{1r}{1r} = \boxed{r}$$

(A)

$$\frac{r_0 - r}{r_{n-1}} = d \quad a_{n+1} = 1 \rightarrow a + nd = 1 \rightarrow \frac{r_0}{r_{n-1}} = 1 \rightarrow \frac{r_0}{r_{n-1}} = 1$$

$$\rightarrow 10n = 10n - 9 \rightarrow \boxed{n = 9}$$

(9)

$$a_n + a_{n+1} = a_r + a_{14} \rightarrow r+14 = r_n + 1 \rightarrow n = 14$$

(6)

$$a_n = r d \frac{n}{r} \rightarrow a_1 = r a_r \rightarrow a + v d = r a + 9 d \rightarrow r a + d = a \rightarrow a + d = 0 = a_r$$