

$$(1) a_1 = f. \quad a_f = 91 \quad d = \frac{91 - f.}{f} = v \quad \underline{17,5} \quad \text{پ}$$

$$a_n = f. + (n-1)v = 2.1 \rightarrow f. + vn - v = 2.1 \Rightarrow vn = 2.1 - 33$$

$$n = 20 \quad \checkmark \quad vn = 17.5 \quad \checkmark$$

$$(2) 100 \leq vx + 1 \leq 999 \Rightarrow 13 \leq x \leq 142, -$$

$$142 - 14 + 1 = 129 \quad \checkmark$$

$$(3) a_n + d + a_n + 2d + a_n + 3d = -4n + 12 \Rightarrow 3a_n + 6d = -4n + 12$$

$$3a_n = -4n \Rightarrow a_n = -\frac{4}{3}n \Rightarrow d = 2$$

$$(-2n) + 1 + (-2n) + 2 + (-2n) + 3 = -4n + 12 \Rightarrow -4n + 9 = -4n + 12 \quad ??$$

$$(4) \frac{r^{x+1}}{r^x \times r} = \frac{r^x - 1 + r^x - 1}{r} \Rightarrow r^x = r^x + r^x - 1 \Rightarrow r^x = 1 \Rightarrow x = 1$$

$$1, f, 1 \Rightarrow \text{ع} \Rightarrow \underline{9} \quad \checkmark$$

$$(5) a_{12} - a_1 = 5 \Rightarrow a + 11d - a - 9d = 2d = 5 \Rightarrow d = \frac{5}{2}$$

$$a_{12} + a_1 = 25 \Rightarrow 2a + 5 = 25 \Rightarrow a = 10$$

$$a_{11} = \frac{-25}{2} + 10 \times \frac{5}{2} = \frac{-25}{2} + 25 = \frac{25}{2} \quad \checkmark$$

$$(6) \frac{5}{r} (12a_1 + 12d) = \frac{5}{r} \times \frac{1}{r} (12a_1 + 12d) \Rightarrow 12a + 12d = \frac{12a_1 + 12d}{r}$$

$$12a + 12d = a + 12d \Rightarrow 12a = a \Rightarrow 12a = 0 \Rightarrow a = 0$$

$$a_{12} = a + d \quad a_{12} = 12a \quad a_1 = a \quad \frac{a_{12}}{a_1} = 12 \quad \checkmark$$

$$(7) t_n = t_{n-1} + 15 \quad \text{ت+و}$$

$$(t_9 - t_5) = (t_9 - t_5)(t_9 + t_5) \Rightarrow \frac{t_9 - t_5}{r} = 15 \Rightarrow 15 \times 2 = 30$$

$$t_9 - t_5 = 15 \quad t_9 = t_5 + 15 = t_1 + 12 \Rightarrow t_9 - t_1 = 12 \quad \checkmark$$

$$t_5 = t_1 + 15 \quad d = 15 \quad \checkmark \quad t_9 + t_5 = t_1 + t_9 = 12 \quad \checkmark$$

$$(8) d = \frac{b-a}{n+1} \Rightarrow d = \frac{1 + \sqrt{3} - 1 + 12\sqrt{3}}{13} = \frac{13\sqrt{3}}{13} = \sqrt{3}$$

$$(9) \frac{32-2}{n-2+1} \rightarrow \frac{30}{n-1} = \frac{15}{n-1} \quad a_{n+1} = 11 \rightarrow a_1(n+1)d$$

$$2 + (n) \times \frac{15}{n-1} = 11 \Rightarrow 4n - 3 = 15n \Rightarrow n = 3 \quad \checkmark$$

$$(10) \quad a_n + a_{n+r} = a_r + a_{1+n}$$

$$ra_1 + (n-1+n+r)d = ra_1 + 1nd$$

$$rn-r=1n \Rightarrow \underline{n=1}$$

$$a_n = ra_{\frac{n}{r}}$$

$$a_n = ra_r$$

$$a_1 + rd = ra_1 + rd \Rightarrow rd = -ra_1$$

$$\underline{-a_1 = d}$$

$$a_n - a_1 + (n-1)d \Rightarrow a_1 + (n-1)(-a_1) = 0$$

$$r-n=0 \Rightarrow \underline{n=r} \checkmark$$

$$n=1 \rightarrow a_1 + a_2 + a_3 = 4 \quad \text{سوال ۳}$$

$$n=2 \rightarrow a_2 + a_3 + a_4 = 0 \rightarrow a_4 - a_2 = -4$$

$$a_1 + 3d - a_1 - 2d = -4 \rightarrow rd = -4 \rightarrow d = -4$$

$$a_1 + a_2 + a_3 = 4 \rightarrow 3a_1 + d + 2d + rd = 4 \rightarrow 3a_1 = 11 \rightarrow a_1 = 4$$

$$a_{11} + a_1 = a_1 + a_1 + 10d + rd$$

$$2a_1 + 11rd = 2(4) + 11(-4) = -42$$

سوال ۳

$$a_3 + a_1 r = a_1 + a_1$$

$$r^n - 1 + r^{r^n} - r = r(r^{n+1})$$

$$r^n - r = r(r \times r^n) - r^n$$

$$r^n - r \times r^n - r = 0 \longrightarrow r^n = r$$

$$r^n - r - r = 0 \longrightarrow r = r \longrightarrow n = 2$$

عقده ۱-۲

$$\text{حاصل} \rightarrow \frac{r}{r-1} / \frac{r+1}{r} / \frac{r(r)}{r-r} = \boxed{24}$$