

$$(1) a_1 = f. \quad a_f = 91 \quad d = \frac{91 - f.}{f} = v$$

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

$$n = 20 \quad vn = 145$$

$$(2) 100 \leq \sqrt{x+3} \leq 999 \Rightarrow 13 \leq x \leq 142$$

$$142 - 13 + 1 = 129 \checkmark$$

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

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

$$(-2n) + 2 + (-2n) + 4 + (-2n) + 6 = -4n + 12 \Rightarrow -4n + 12 = -4n + 12 \quad ??$$

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

$$1, 1/1 \Rightarrow \text{ع} \Rightarrow 1 \checkmark$$

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

$$a_{12} + a_1 = 20 \Rightarrow 2a + 5 = 20 \Rightarrow a = -\frac{15}{2}$$

$$a_{11} = -\frac{15}{2} + 10 \times \frac{5}{2} = -\frac{15}{2} + 25 = \frac{35}{2} \checkmark$$

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

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

$$a = a + d$$

$$a_r = 12a$$

$$a_1 = a$$

$$\frac{a_r}{a_1} = \frac{12}{1} \checkmark$$

$$(7) t_n = t_{n-1} + 15$$

$$(t_9 - t_5) = (t_9 - t_5)(t_9 - t_5) \Rightarrow \frac{t_9 - t_5}{r} = 15 \Rightarrow 15 \times 5 = 15$$

$$t_9 - t_5 = 15$$

$$t_5 = t_9 + 15$$

$$t_9 = t_5 + 15$$

$$t_v = t_f + 15 = t_1 + 15 \Rightarrow t_v - t_f = 15$$

$$d = 15 \checkmark$$

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

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

$$2 + (n) \times \frac{15}{r_n-1} = 11 \Rightarrow 9n - 3 = 15n \Rightarrow n = 3 \checkmark$$

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

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

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

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

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

$$a_n = ra_r$$

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

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

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