

19

$$\sqrt{x}(x) \geq 0 \quad x \geq 0 \quad f(x) \geq 0$$

$$[-\infty, 0] \cup [2, \infty] \leftarrow$$

✓

$$\frac{-x}{f(x)} \geq 0 \quad \text{و} \quad f(x) \neq 0$$

$$\frac{-x}{f(x)} \geq 0 \quad \text{و} \quad f(x) \neq 0$$

(1)

$$-x \geq 0 \rightarrow x \leq 0$$

$$f(x) < 0 \rightarrow (-2, 0) \cup (0, 2)$$

$$\rightarrow (-2, -1) \cup (-1, 0) \cup (0, 1) \cup (1, 2)$$

$$-f(2) = 2$$

$$f(2) = -2$$

$$f(-2) + 2 = 2 + 2 + 2$$

$$f(-2) = 1 \leftarrow$$

✓

$$f\left(\frac{1}{f(2)}\right) + f\left(\frac{1}{f(1)}\right) = 9 \leftarrow$$

✓

$$f(x-1) = a(x-1)^2 - b(x-1) + 2 = a(x^2 + 1 - 2x) - bx + b + 2$$

$$ax^2 + a - 2ax - bx + b + 2 = ax^2 + bx - 2 = -2ax + a + b$$

$$-2ax + b + a = 4x + 2 \rightarrow -2a = 4 \rightarrow a = -2 \quad b = a$$

$$a - b = -2 - a = -4 \leftarrow$$

✓

$$\frac{r+0}{1} = \textcircled{V} \leftarrow$$

$$f(n) = n^r - r n + 1 \rightarrow \begin{cases} f(r) = r^r - r(r) + 1 = 1 \\ f(-1) = (-1)^r - r(-1) + 1 = 0 \\ f(r) = r^r - r(r) + 1 = -1 \end{cases} \quad \textcircled{V} \checkmark$$

$$\frac{14-1}{5} = \textcircled{\frac{13}{5}} \leftarrow$$

$$f(n) = \begin{cases} r n + 1 & n \geq r \\ n^r & n < r \end{cases} \rightarrow \begin{cases} f(r) = r(r) + 1 = 13 \\ f(-r) = (-r)^r = r \\ f(r) = r(r) + 1 = 13 \end{cases} \quad \textcircled{V} \checkmark$$

$$\frac{4-1}{1} = \textcircled{0} \leftarrow$$

$$\begin{aligned} r &\xrightarrow{f} 1 \xrightarrow{f} 4 \rightarrow f(f(r)) = 4 \\ r &\xrightarrow{f} r \xrightarrow{f} 4 \rightarrow f(f(r)) = 4 \\ &\xrightarrow{f} 4 \rightarrow f(1) = 4 \end{aligned} \quad \textcircled{V} \checkmark$$

$$\frac{r+r+r\sqrt{r}+r\sqrt{r}-1+9}{r+r-\sqrt{r}+\sqrt{r}-1+0} = \frac{1}{r} = \textcircled{r}$$

$$\frac{r+1+9}{r+1+0} = \textcircled{\frac{r+1}{1}} \leftarrow$$

$$(\sqrt{n})^r + \frac{1}{(\sqrt{n})^r} = n + \frac{1}{n}$$

$$\textcircled{V} \checkmark$$

$$(n + \frac{1}{n})^r = n^r + r + \frac{1}{n^r}$$

$$n^r + r + \frac{1}{n^r} - n^r - \frac{1}{n^r} = \textcircled{r} \leftarrow$$