

$$f\left(\frac{\sqrt{x}}{x} + 1\right) \rightarrow f(x^r) - f(x)$$

$$f\left(\frac{r}{x} + \sqrt{x} + 1\right) - r\sqrt{x} - f = -\frac{1}{x}$$

9

$$f(f(a)) = a$$

$$\hookrightarrow \frac{\frac{a+1}{a-1} + 1}{\frac{a+1}{a-1} - 1} = \frac{\frac{ra}{a-1}}{\frac{r}{a-1}} = a \quad R = \{1\}$$

v

$$f(g(a)) = -f$$

$$\sqrt{a^r - 1} = t$$

$$(\sqrt{a^r - 1})^r - f\sqrt{a^r - 1} = -f \rightarrow t^r - ft = -f$$

$$(t-r)^r = 0$$

$$t = r \rightarrow \sqrt{a^r - 1} = r \rightarrow a = \pm \sqrt{a}$$

Λ

$$f(f) \times f(-r)$$

$$\left. \begin{array}{l} f(-r) \xrightarrow{x=-r} r^r + r \cdot + r = \sqrt{r} \\ f(r) \xrightarrow{x=1} 1 - a + r = r \end{array} \right\} 1 \neq f$$

9

$$f(r \cos^r x + a \cos x) = \tan^r$$

$$\cos x = t$$

$$rt^r + at = \sqrt{a} \rightarrow \Lambda t^r + 1 \cdot t - \sqrt{t} = 0$$

$$+r + 1 \cdot t - a^r = 0$$

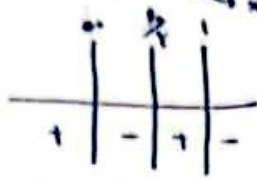
$$t = \frac{1}{\Lambda a} \quad t = -\frac{r}{\Lambda}$$

$$1 + \tan^r = \frac{1}{\frac{1}{\Lambda a}} \rightarrow \tan^r x = \frac{r \Lambda}{19}$$

1.

$$\sqrt{\frac{(x-1)^2 - x^2}{(x-1)^2}} \rightarrow 1-2x \rightarrow x = \frac{1}{2}$$

$$\frac{1}{(x-1)^2} \rightarrow x=1, x=...$$



$(-\infty, 1)$

(الف)

$$\frac{x-2x-1}{(x+1)x} \rightarrow x=1, x=...$$

$$\frac{2x+4, x=1}{(x-1)(x+2)} \rightarrow 2x+5 \rightarrow x = -\frac{5}{2}$$

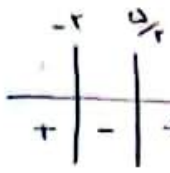
$$\frac{1}{(x-1)(x+2)} \rightarrow x=1, x=-2$$

$$R = \left\{ -1, 0, -\frac{5}{2}, 1, -2 \right\}$$

$$f(x) = \sqrt{\left(\frac{1}{x}\right)^2 - 1} (2x - 4x)$$

$$\downarrow x = -2 \quad \downarrow 2x - 4x = 0$$

$$2x = 4 \rightarrow x = \frac{2}{1}$$



$$(-\infty, -2] \cup [\frac{2}{1}, +\infty)$$

(الف)

$$\sqrt{\frac{x-1}{a}} + \sqrt{\frac{y+1}{b}} = 3$$

$$\sqrt{x-1} \leq 3$$

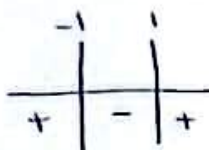
$$a+b=3$$

$$a \leq 3$$

$$D_f = [1, \infty)$$

$$f(x) = \frac{\log_f(x^2 - x - 2)}{\sqrt{x^2 - 1} + 1}$$

$$\downarrow x = \pm 1$$



$$\rightarrow (-\infty, -1] \cup [1, +\infty)$$

$$x^2 - x - 2 = 0$$

$$(x-2)(x+1) = 0$$

$$x = 2, x = -1$$

$$(-\infty, -1) \cup (2, +\infty)$$



$$f(x) = \sqrt{x^2 + ax + 2}$$

$$-2 \Rightarrow -f - 2a + 2 = 0$$

$$a = -\frac{1}{2}$$

$$-x^2 - \frac{1}{2}x + 2 = 0$$

$$x = \frac{3}{2}$$

$$b+a=1$$

$$g(x) = \sqrt{f(x) - x}$$

$$\rightarrow \geq 0$$

$$\textcircled{1} \xrightarrow{x < 1} \sqrt{2x + 2 - x} \Rightarrow \sqrt{x+2} \Rightarrow x \geq -2 \rightarrow -2 \leq x < 1$$

$$\textcircled{2} \xrightarrow{x \geq 1} \sqrt{2x - 2 - x} \Rightarrow \sqrt{x-2} \Rightarrow x \geq 2 \rightarrow [-2, 1) \cup [2, +\infty)$$