

$f(x) = \sqrt{\frac{(x-1)^2 - x^2}{x(x-1)}} \Rightarrow \frac{-2x+1}{x(x-1)} \geq 0$

0	1	1
+	-	+
2	2	2

$= (-\infty, 0) \cup [\frac{1}{2}, 1)$

$g) f(x) = \frac{\frac{1}{x+1} - \frac{2}{x}}{\frac{2}{x-1} + \frac{1}{x+2}} \Rightarrow \frac{1x+2+x-1}{(x-1)(x+2)} = 0 \Rightarrow x = 1-2 = -\frac{1}{2}$

$\Rightarrow R - \{0, -1, 1, -2, -\frac{1}{2}\}$

$\sqrt{(\frac{1}{x})^2 - 1} (3x - x^2) \geq 0$

$3 - x = x^2 \Rightarrow x = -2$
 $x^2 = 3 \Rightarrow x = \pm\sqrt{3}$

-2	0	3
+	-	+
2	2	2

$h) \sqrt{x-1} + \sqrt{y+1} = 3 \Rightarrow \begin{cases} x-1 \geq 0 \Rightarrow x \geq 1 \\ 3 - \sqrt{x-1} \geq 0 \Rightarrow x-1 \leq 1 \Rightarrow x \leq 2 \end{cases} \Rightarrow Df = [1, 2]$

$1) x^2 - x - 2 > 0 \Rightarrow (x-2)(x+1) > 0$

-1	2
+	+
2	2

$2) \sqrt{x^2-1} \Rightarrow x^2-1 \geq 0 \Rightarrow x^2 \geq 1$
 $\Downarrow$
 $x \leq -1 \text{ یا } x \geq 1$

$\cap = (-\infty, -1) \cup (1, +\infty)$

$\sqrt{3+ax-x^2}$

$\text{ریشه} = -2 \Rightarrow 3-2a-1=0 \Rightarrow a = -1$
 $\boxed{a = -\frac{1}{2}}$

$-x^2 - \frac{1}{2}x + 3 = 0 \Rightarrow x-2 \Rightarrow 2x^2+x-6=0$
 $\Downarrow$
 $x^2+x-12=0$
 $(x+4)(x-3)=0$
 $\Downarrow$
 $x = -4 \text{ یا } x = 3$
 $\frac{3}{2} = b$

$a+b = \boxed{1}$

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

$f(x) = \begin{cases} 2x-2 & x \geq 1 \\ 2x+3 & x < 1 \end{cases}$

$1) f = f(x) = x \Rightarrow \begin{cases} 2x-2 = x \Rightarrow x = 2 \\ 2x+3 = x \Rightarrow x = -3 \end{cases}$

-3	1	2
+	+	+
2	2	2

~~Handwritten scribbles and corrections~~

$$\sin \frac{\pi}{4} + \cos \frac{\pi}{4} = \frac{\sqrt{2}}{2} + \frac{\sqrt{2}}{2} = \sqrt{2}$$

$$\boxed{-\frac{1}{r}}$$

$$f\left(\frac{r}{r+1}\right) = r\left(\frac{r}{r+1} - 2\right) \Rightarrow \lim_{r \rightarrow \infty} \left(\frac{r}{r+1} + 1 + \sqrt{r} - \sqrt{r} - 2\right) \Rightarrow r\left(-\frac{1}{r}\right)$$

$$f(a) = \frac{a+1}{a-1}$$

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

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

نمایش دهم

$$a = R - \{1\} \Leftrightarrow \boxed{a \in R} \Rightarrow \boxed{a = a}$$

$$\frac{a+1+a-1}{a-1} = \frac{2a}{r} = a \Rightarrow \boxed{a = a}$$

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

$$g(a) = \sqrt{a^2 - 1}$$

$$\sqrt{a^2 - 1} = r \Rightarrow a^2 - 1 = r^2 \Rightarrow a = \pm \sqrt{r^2 + 1}$$

$$f(\sqrt{a^2 - 1}) = \frac{a^2 - 1}{\sqrt{a^2 - 1}} - \varepsilon \sqrt{a^2 - 1} + f = 0 \Rightarrow t - \varepsilon t + \varepsilon = 0 \Rightarrow (t - r)^2 = 0 \Rightarrow t = r$$

$$f(x+r) = x^2 - \omega x + 9$$

$$f(1) \Rightarrow \text{if } x=1 \Rightarrow (1)^2 - \omega + 9 = 2 \Rightarrow \boxed{1 \leq \omega}$$

$$f(-9) \Rightarrow \text{if } x=-9 \Rightarrow (-9)^2 + \omega + 9 = 72 \Rightarrow \boxed{63 \leq \omega}$$

$$f \cos^2 x + \omega \cos x = \frac{1}{r} \Rightarrow f \cos^2 x + \omega \cos x - \frac{1}{r} = 0$$

$$1 \cos^2 x + 10 \cos x - 1 = 0$$

$$\cos^2 x + 10 \cos x - 1 = 0$$

$$(\cos x + 11)(\cos x - 1) = 0$$

$$\cos x = \frac{1}{11} \Rightarrow x = 90^\circ$$

$$\cos x = -\frac{1}{11} \Rightarrow \text{ممنوع}$$

$$-1 \leq \cos x \leq 1$$

راه حل دیر سوال (۵)

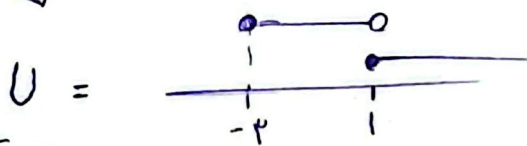
$$g(x) = \sqrt{f(x) - x}$$

$$f(x) = \begin{cases} 3x-2 & x \geq 1 \\ 2x+3 & x < 1 \end{cases}$$

if $x \geq 1$ $\Rightarrow g(x) = \sqrt{\frac{3x-2}{x-1}}$ $\Rightarrow 3x-2 \geq 0 \Rightarrow x \geq \frac{2}{3} \Rightarrow \cap_{\frac{2}{3}} \Rightarrow x \geq 1$

$x < 1$ $\Rightarrow g(x) = \sqrt{\frac{2x+3}{x+1}}$ $\Rightarrow 2x+3 \geq 0 \Rightarrow x \geq -\frac{3}{2} \Rightarrow \cap_{-\frac{3}{2}} \Rightarrow [-\frac{3}{2}, 1)$

$\Downarrow$



$$\Rightarrow [-\frac{3}{2}, +\infty)$$

توجه: تنها به راه حل دوم در این بزرگ توجه شود نه راه حل در بزرگ تلف