

۱۹،۷۵ آفرین عالی نویسنده

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①

الف- $x \neq 1$ $x \neq 0$ $\frac{x-1}{x} - \frac{x}{x-1} > 0$

$$\frac{\cancel{x^2} + 1 - \cancel{2x}}{x(x-1)} \geq 0 \quad \frac{1-2x}{x(x-1)} \geq 0$$

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

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

ب- $x \neq 0$ $x \neq -1$ $x \neq 1$ $x \neq -2$ $x \neq -\frac{3}{2}$

$$\frac{x}{x-1} + \frac{1}{x+2} \neq 0 \quad \frac{x^2 + 4 + x - 1}{(x-1)(x+2)} = 0 \quad x + 3 = 0$$

$$D = \mathbb{R} - \{-2, -\frac{3}{2}, -1, 0, 1\}$$

②

$$(32 - 4^x) \left(\left(\frac{1}{4}\right)^x - 9 \right) > 0$$

x	-2	$\frac{5}{2}$
$+$	$-$	$+$

$$32 = 4^x \rightarrow 2^5 = 2^{2x} \rightarrow 2x = 5 \rightarrow x = \frac{5}{2}$$

$$\left\{ \begin{array}{l} 2x = 0 \quad x = 0 \\ \left(\frac{1}{4}\right)^x = 9 \quad 2^{2x} = 2^{-x} \end{array} \right.$$

$$D = (-\infty, -2] \cup \left[\frac{5}{2}, +\infty\right)$$

$$\left\{ \begin{array}{l} \left(\frac{1}{4}\right)^x = 9 \quad 2^{2x} = 2^{-x} \\ \boxed{x = -2} \end{array} \right.$$

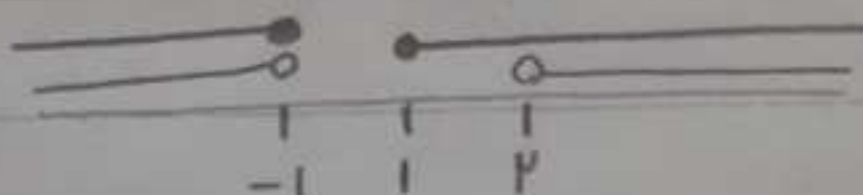
ب - $x-1 \geq 0 \Rightarrow x \geq 1 \wedge x \leq 12 \leadsto \boxed{1 \leq x \leq 12}$ (۲)

$\sqrt{y+1} = 3 - \sqrt{x-1} \Rightarrow \sqrt{x-1} \leq 3$
 $\sqrt{x-1} \geq 0 \Rightarrow x-1 \leq 9 \Rightarrow x \leq 10$

$x^2 - x - 2 \geq 0 \Rightarrow (x-2)(x+1) \geq 0$ (۳)

$x^2 - 1 \geq 0 \Rightarrow x^2 \geq 1$

$x \geq 1 \quad x \leq -1$



$D = (-\infty, -1) \cup (2, +\infty)$ (۲)

$x^2 + ax - x^2 \geq 0 \Rightarrow x^2 - ax - 3 \leq 0$ (۴)

$x \mid -2 \quad b$
 $p \mid + \quad - \quad +$

$-3 + 7 + 2a = 0 \Rightarrow 2a = -4 \Rightarrow a = -2$

$x^2 + \frac{1}{2}x - 3 \leq 0$

$b = \frac{3}{2} \quad a = -2$

$a+b = \frac{3}{2} - 2 = -\frac{1}{2}$ (۱)

$2x^2 + x - 6 \leq 0$
 $x^2 + x - 3 \leq 0$
 $(x+2)(x-3) \leq 0$

$(-2) = -\frac{1}{2} \quad (\frac{3}{2})$

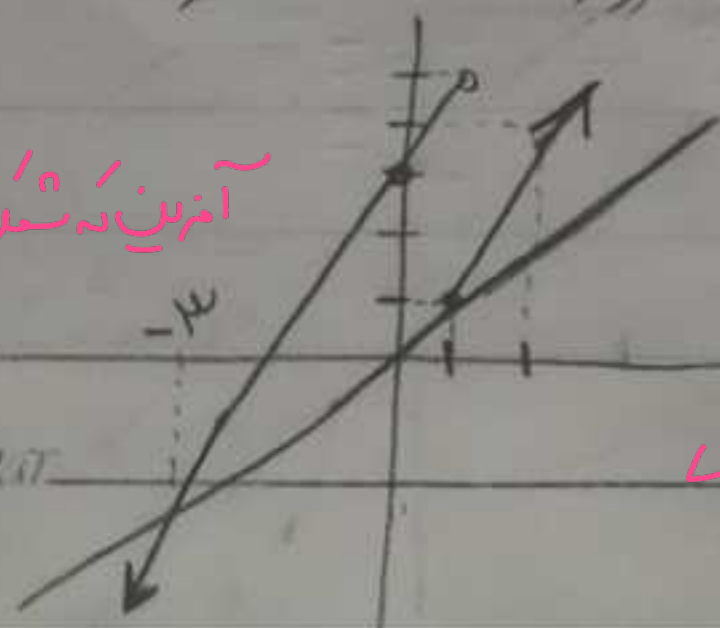
$f(x) - x \geq 0$

$f(x) \geq x$ (۵)

آفرین نه شمر کنیدی!



Senobar



$2x + 3 = x$

$x = -3$

$D = (-3, +\infty)$

$$\sin \frac{\pi}{3} = \frac{\sqrt{3}}{2} \quad \cos 2\pi = 1$$

(6)

$$f\left(\frac{1+\sqrt{3}}{2}\right) = \frac{1}{2} \times \frac{(1+\sqrt{3})^2}{2} - \frac{1}{2} \left(\frac{1+\sqrt{3}}{2}\right) =$$

$$\frac{1 + \sqrt{3} - 1 - \sqrt{3}}{2} = -\frac{1}{2}$$

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

(✓)

۱,۷۵

برای هر مقدار از a که $a \neq 1$ باشد، خواهیم داشت $f(f(a)) = a$ به عبارت دیگر
 این تابع دو مرتبه اعمال شده به هر عددی که $a \neq 1$ باشد، به همان عدد بازمی‌گردد.

$$D_f = \mathbb{C} \setminus \{1\}$$

$$g(a) = b \quad f(b) = -f \quad x^2 - \varepsilon x = -\varepsilon$$

(1)

$$x^2 - \varepsilon x + \varepsilon = 0 \quad (x-2)^2 = 0 \quad x = 2 \quad b = 2$$

$$g(a) = 2 \quad \sqrt{a^2 - 1} = 2 \quad a^2 - 1 = 5 \quad a = \pm \sqrt{5}$$

$$f(\varepsilon) \leadsto x + 3 = \varepsilon \quad x = 1 \leadsto 1 - 5 + 4 \leadsto f(\varepsilon) = 2$$

(9)

$$f(-3) \leadsto x + 3 = -3 \leadsto x = -6 \leadsto 3^2 + 10 + 4 \leadsto f(-3) = 17$$

$$17 \times 2 = 34$$

$$f \cos x^2 + \omega \cos x = \frac{1}{\omega} \quad f(0) = \tan 45^\circ \rightarrow f(90) = 3$$

(10)

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

$$\cos x = -\frac{1}{10} \leadsto \frac{1}{10} x \quad f(3, \omega) = \tan 40^\circ \rightarrow \sqrt{13}$$

$$\cos x = \frac{1}{10} \leadsto \frac{1}{10} x \quad x = 90^\circ$$