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الف) $y = \sqrt{|x-2| - 3}$ $|x-2| - 3 \geq 0$ $|x-2| \geq 3$ 5

$$D_f = (-\infty, -1] \cup [5, +\infty)$$

$$x-2 \geq 3$$

$$x-2 \leq -3$$

$$x \geq 5$$

$$x \leq -1$$

ب) $y = \sqrt{4 - |x-1|}$ $4 - |x-1| \geq 0$ $|x-1| \leq 4$ 6

$$D_f = [-3, 5]$$

الف) $y = \sqrt{-x|x|}$ $-x|x| \geq 0$ $x|x| \leq 0$ 6

صورت سوال را اشتباه ننویسید if $\mathbb{R}^+ \rightarrow x|x| \geq 0$ $D_f = (-\infty, 0]$

if $a \rightarrow x|x| = 0$ $y = \sqrt{1 - x|x|}$ ∞ ✓

if $\mathbb{R}^- \rightarrow x|x| \leq 0$ ✓

①

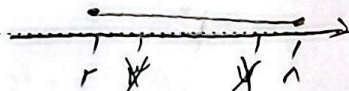
ب) $y = \frac{1}{\sqrt{3 - |x-\omega| - 1}}$ $3 - |x-\omega| \geq 0 \rightarrow |x-\omega| \leq 3 \rightarrow -2 \leq x \leq 1$

⊛⊛ $\sqrt{3 - |x-\omega| - 1} \neq 0 \rightarrow \sqrt{3 - |x-\omega|} \neq 1 \rightarrow |x-\omega| \neq 2$ $x-\omega \rightarrow 2$ $x-\omega \rightarrow -2$

$$D_f = [2, 3) \cup (3, 4) \cup (4, 1]$$

$$x \neq 3$$

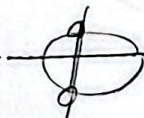
$$x \neq 4$$



الف) $y = \frac{-\sin^2 x - 1}{\cos x}$ $\sin^2 x + \cos^2 x = 1$ $\sin^2 x - 1 = -\cos^2 x$ 7

$$\cos x \neq 0$$

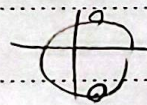
$$\rightarrow \frac{\pi}{2} + k\pi$$



$$D_f = \mathbb{R} - \left\{ \frac{\pi}{2} + k\pi \right\}$$

ب) $y = \frac{\cos x}{2\cos x - 1}$ $2\cos x - 1 \neq 0 \rightarrow \cos x \neq \frac{1}{2} \rightarrow \cos x = \frac{1}{2}$ $\rightarrow \frac{\pi}{3} + k\pi$ $\rightarrow \frac{5\pi}{3} + k\pi$

$$D_f = \mathbb{R} - \left\{ \frac{\pi}{3} + k\pi, \frac{5\pi}{3} + k\pi \right\}$$



$$y = \frac{x+r}{|x+1| - (x+r)}$$

$$|x+1| - (x+r) \neq 0$$

$$|x+1| \neq |x+r| \Rightarrow |x+1| = |x+r|$$

$$D_f = R - \sum_{i=1}^n \frac{r_i}{x+r_i}$$

$$x+1 = x+r \quad (1)$$

$$x+1 = -(x+r) \quad (2)$$

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

$$y = \sqrt{|x+1| - (x+r)}$$

$$|x+1| - (x+r) \geq 0$$

$$|x+1| \geq x+r$$

$$(x+1)^2 \geq (x+r)^2$$

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

$$(1-r)(x+r) \geq 0$$

$$D_f = (-\infty, -\frac{r}{2}] \cup [r, +\infty)$$

$$\begin{array}{c|cc} x & -\frac{r}{2} & r \\ \hline & + & - \end{array}$$

$$f(x) = \sqrt{\log_{10} \log_{10} (x-1)}$$

$$x-1 > 0 \Rightarrow x > 1$$

$$\log_{10} (x-1) > 0 \Rightarrow x-1 > 1 \Rightarrow x > 2$$

$$\log_{10} (x-1) > 0 \Rightarrow x-1 > 1 \Rightarrow x > 2$$

$$\log_{10} (x-1) \geq 1 \Rightarrow x-1 \geq 10 \Rightarrow x \geq 11$$

$$D_f = [11, +\infty)$$

$$1 < x \leq 2$$

$$x \geq 11 \Rightarrow x \geq 11$$

$$y = \log_{10} (x \cos x + 1)$$

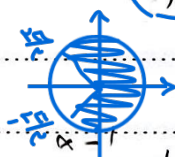
$$x \cos x + 1 > 0$$

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$$\cos x > -\frac{1}{x}$$

$$D_f = (x \cos x - \frac{1}{x} > 0 \Rightarrow x \cos x > \frac{1}{x})$$

$$\log_{10} \frac{x-1}{x+1} \geq 1 \Rightarrow x \neq -1$$



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

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

$$x < -1 \Rightarrow x < -1$$

$$D_f = (-\infty, -1)$$

$$f(x) = \sqrt{(x-1)x^2 + ax + b} \quad D_f = [1, +\infty)$$

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$$\begin{cases} \text{با } x=1 \text{ به } (x-1)(x-1)^2 a & b \\ \text{در } x=1 & (x-1)x^2 - 9(x-1)x + 1(x-1) = 0 \end{cases}$$

باید خط باریک مثبت باشد :

$$-9(x-1) = 9 \Rightarrow 9x = 12 \Rightarrow x = \frac{12}{9}$$

$$b = 9(x-1) \Rightarrow 9\left(\frac{12}{9} - 1\right) = b \Rightarrow b = 9\left(\frac{1}{3}\right) \Rightarrow b = \frac{11}{3}$$

$$f(x) = \sqrt{x^2 + 2x + 1 - m^2} \quad D_f = \mathbb{R}$$

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$$x^2 + 2x + 1 - m^2 \geq 0$$

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

$$\text{در } x=0 \text{ / } \min = 0 \rightarrow 1 - m^2 \geq 0 \rightarrow (-1 \leq m \leq 1) \rightarrow \max$$

$$(-1, 1) \cup \{-1, 1\}$$

$$f(x) = \sqrt{F - x^2} \quad F - x^2 \geq 0$$

$$x^2 \leq F \Rightarrow -\sqrt{F} \leq x \leq \sqrt{F}$$

3

$$x \in [-\sqrt{F}, \sqrt{F}]$$

$$D_f = [-\sqrt{F}, \sqrt{F}]$$

$$(-\sqrt{F}, \sqrt{F}) \cup \{-\sqrt{F}, \sqrt{F}\}$$

$$[a] + [-a] + 1 \neq 0$$

$$\text{if } x \in \mathbb{Z} \Rightarrow [x] = x$$

$$[-x] = -x$$

$$\Rightarrow [x] + [-x] + 1 = x - x + 1 = 1$$

این را در صحت قبول می‌کنیم

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$$\text{if } y = \sqrt{x^2 + 2x + 1}$$

$$x^2 + 2x + 1 \geq 0$$

$$x^2(x+1) \geq 0$$

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

$$1, 5$$

$$(x+1)(x-1)$$

$$(x+1)(x-1) \geq 0$$

$$(x+1)(x-1) \geq 0$$

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

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

$$D_f = (-\infty, -1] \cup \{0\} \cup [1, +\infty)$$

(۱) چون دامنه تک بازه است پس عبارت نمی تواند یک سهمی باشد و باید یک خط باشد!

$$a - 2 = 0 \rightarrow a = 2 \rightarrow f(x) = \sqrt{2x + b} \quad D_f = [3, +\infty) \rightarrow f(3) + b = 0 \rightarrow \boxed{b = -4}$$

ج-۴) $\frac{(x^2-1)(x^2-3x^2)}{(x^2-1)} \geq 0 \rightarrow \frac{(x-1)(x+1)(x^2)(x-3)}{(x-1)(x^2+x+1)} \geq 0$

$\frac{-1}{+} \quad \frac{0}{-} \quad \frac{3}{-} \quad \frac{0}{+}$

$D_f = (-\infty, -1] \cup \{0\} \cup [3, +\infty)$
۵۰۰ ریشه ندارد

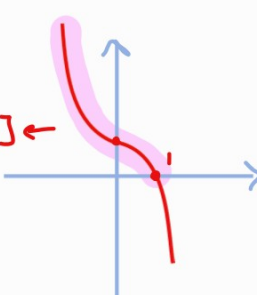
الف-۴) $1 - x|x| \geq 0$

$x \geq 0 \rightarrow 1 - x^2 \geq 0 \rightarrow x^2 \leq 1 \rightarrow -1 \leq x \leq 1$
 $x \leq 0 \rightarrow 1 + x^2 \geq 0$

همواره مثبت ✓

الته می توانیم مثل نابرابری را رسم کنیم

$D_f = (-\infty, 1]$



الف-۱۰) $2c \cdot \sin + 1 > 0 \rightarrow c \cdot \sin > -\frac{1}{2}$

$D_f = (2k\pi - \frac{\pi}{6}, 2k\pi + \frac{\pi}{6})$

