

۱۹، ۷۵

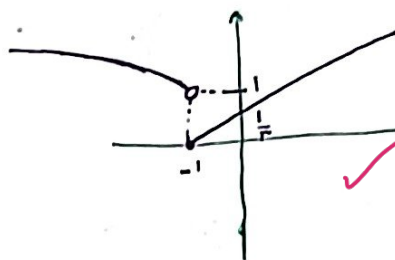
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تکلیف شماره ۲

نام و نام خانوادگی: فرار شیرانی

①

$$x = \begin{cases} 2y-1 & y \geq 0 \\ -y^2 & y > 1 \end{cases}$$



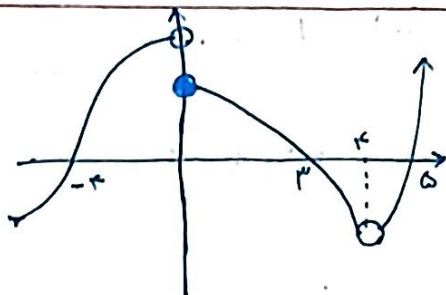
$$y \geq 0 \rightarrow x = 2y-1 \rightarrow y = \frac{x}{2} + \frac{1}{2}$$

$$\rightarrow y \geq 0 \rightarrow \frac{x}{2} + \frac{1}{2} \geq 0 \rightarrow x \geq -1$$

$$y > 1 \rightarrow x = -y^2 \rightarrow \sqrt{-x} = y$$

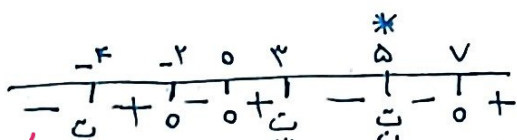
$$y > 1 \rightarrow \sqrt{-x} > 1 \rightarrow -x > 1 \rightarrow x < -1$$

بنا بر آنچه به نمودار ملاحظه است.



$$g(x) = \sqrt{\frac{x \cdot f(x-2)}{f(x)}}$$

$$\frac{x \cdot f(x-2)}{f(x)} \geq 0 \rightarrow \begin{cases} 1, f(x-2) \rightarrow x = 7, 5, -2 \\ 2, f(x) \rightarrow x = 5, 3, -4 \\ 3, x \rightarrow x \neq 0 \end{cases}$$



فقط حواصی باشد که $x=4$ در دامنه f و $x=4$ در دامنه $f(x-2)$ نیست که در این به دست آمده نیست.

$$\rightarrow D = (-4, -2) \cup [0, 2) \cup [7, +\infty)$$

$$f(x) = \frac{2x^2 - 2x + 2}{x^2 - 4x}$$

$$x^2 - 4x \neq 0 \rightarrow x(x-4)(x+2) \neq 0$$

$$\rightarrow x \neq 0, 2, -2$$

$$D_f = \mathbb{R} - \{0, \neq 2\}$$

$$\frac{2x^2 - 2x + 2}{x^2 - 4x} \geq 0 \rightarrow \frac{2x^2 - 2x + 2}{x(x-4)(x+2)} \geq 0$$

$$\rightarrow \frac{-2}{-} + \frac{0}{+} - \frac{2}{-} + \rightarrow D = (-2, 0) \cup (2, +\infty)$$

$$\text{الف) } y = \sqrt{\frac{x-2}{x^2 - 2x^2 - 1}} \rightarrow \frac{x-2}{(x^2 - 4)(x^2 + 2)} \geq 0 \rightarrow \frac{-2}{-} + \frac{2}{+}$$

$$D = (-2, +\infty) - \{2\}$$

$$\text{ب) } y = \frac{2x^2 + 1}{2 - 2[-x]} \rightarrow 2 - 2[-x] \neq 0 \rightarrow -2[-x] \neq -2 \rightarrow [-x] \neq 1$$

$$2 \leq -x < 3 \rightarrow -2 \geq x > -3 \rightarrow x \neq (-3, -2]$$

$$\rightarrow D = \mathbb{R} - (-3, -2]$$

الف) $f(x) = \frac{\sqrt{x(x^2-1)}}{\sqrt{|x|+x}}$ $\xrightarrow{\text{وقت!}}$ $x(x^2-1) \geq 0 \rightarrow \frac{-1}{0} + \frac{0}{0} + \frac{1}{0} \xrightarrow{(1)} [-1, 0] \cup [1, +\infty)$ (5)

$|x|+x \geq 0 \rightarrow \frac{0}{0} + \frac{0}{2x} \xrightarrow{(2)} (0, +\infty)$ (1, 2, 5)

$\rightarrow (1) \cap (2) = [1, +\infty)$

ب) $\frac{\sqrt{|x-2|-x^2}}{|x|-1}$ $\xrightarrow{\text{وقت!}}$ $|x-2|-x^2 \geq 0 \rightarrow -x^2-x+2 \geq 0 \rightarrow x^2+x-2 \leq 0 \rightarrow (x+2)(x-1) \leq 0 \rightarrow -2 \leq x \leq 1$ (2)

$|x|-1 \neq 0 \rightarrow x \neq \pm 1$ (1)

$(1) \cap (2) \rightarrow D = [-2, 1) \cup (-1, 1]$ ✓

الف) $y = \sqrt{(x-2)[x-3]}$ (4) $[0] \geq 0 \leftarrow$ همیشه هم علامت ندارد (2)

$D = \mathbb{R}$ ✓

ب) $y = \sqrt{|x-1|[x-3]}$ $x \geq 3 \leftarrow x-3 \geq 0$ $\leftarrow [x-3] \geq 0 \leftarrow |x-1| \geq 0$ (2)

$\rightarrow x \geq 3, x=1 \rightarrow D = [3, +\infty) \cup \{1\}$ ✓

داخل قدر مطلق منفی شود

$\frac{1}{||x-2|-1|-k}$ $\xrightarrow{\text{وقت!}}$ $||x-2|-1|-k = 0 \rightarrow ||x-2|-1| = k$ (2) (7)

$|x-2|-1 = k \rightarrow |x-2| = k+1$ (2)

$|x-2|-1 = -k \rightarrow |x-2| = -k+1$ (2)

$|x-2| \geq 0 \rightarrow x=2$ (2)

$|x-2| = 2 \rightarrow x=4, 0$ (2)

$f(x) = \frac{x^2+x+2}{x+1}$ $\rightarrow \frac{x^2+x+2}{x+1}$ (2) (1)

$x^2+x+2 \neq 0 \rightarrow x \neq -1, -2$ (2)

$x+1 \neq 0 \rightarrow x \neq -1$ (2)

$x-1 \neq 0 \rightarrow x \neq 1$ (2)

$\rightarrow x \neq -1, -2, 1$ ✓

$\rightarrow x=3 \rightarrow x^2-4x+9=0 \rightarrow (x-3)^2=0 \rightarrow x=3$ ✓ یک ریشه مضاعف

$y = \log_{x+1} \log_x \frac{1}{x}$ (2) (4)

$x > 0, x \neq 1$ (2)

$\log_{x+1} \frac{1}{x} > 0 \rightarrow \frac{1}{x} > 1 \rightarrow x < 1$ (2)

$\log_{x+1} \frac{1}{x} > 0 \rightarrow \frac{1}{x} < 1 \rightarrow x > 1$ (2)

$x+1 > 0 \rightarrow x > -1, x \neq 0$ (2)

$\rightarrow -1 < x < 1$ ✓

$D_{f(x)} = [-5, 3]$ $D_{f(x+1)}$ (2) (1)

$\rightarrow -5 \leq x^2-1 \leq 3 \rightarrow -4 \leq x^2 \leq 4 \rightarrow -2 \leq x \leq 2$ ✓