

الف) $\frac{x-1}{x} - \frac{x}{x-1} \geq 0 \quad x \neq \{0, 1\}$

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

0 1
+ | - | + | -

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

ب) $\frac{3}{x-1} + \frac{1}{x+2} \neq 0 \Rightarrow \frac{3x+4+x-1}{x^2+x-2}$

$\{x \neq 0, 1, -2, -\frac{5}{4}\}$

$\frac{4x+3}{x^2+x-2} \rightarrow x \neq 1, -2, -\frac{5}{4}$

$D_f = \mathbb{R} - \{-1, 1, 0, -2, -\frac{5}{4}\}$ ✓

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$((\frac{1}{x})^x - 9)(3^x - 4^x) \geq 0$

if $x = -2 \Rightarrow 0$

$\frac{-2}{+} \quad \frac{216}{-}$

$D_f = (-\infty, -2] \cup [216, +\infty)$ ✓

$3^x = 4^x = (2^2)^x$
 $x = 216$
 $x = \log_{\frac{3}{4}} 216$

جواب رادیکال هواه که است پس کل حالت های شش (0,3) و (1,2) و (2,1) و (3,0) و (2,3) و (3,2)

$x-1 > 0 \rightarrow x > 1$
 $3-\sqrt{x-1} > 0 \rightarrow x \leq 82$

(0,3) $\Rightarrow x=1, y=1 \rightarrow (1,1)$
(1,2) $\Rightarrow x=2, y=3 \rightarrow (2,3)$
(2,1) $\Rightarrow x=17, y=0 \rightarrow (17,0)$
(3,0) $\Rightarrow x=82, y=-1 \rightarrow (82,-1)$

$D_f = \{1, 2, 17, 82\}$ [1, 82]

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

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

* نتیجه عبارت هواه + است

$I \cap II \Rightarrow D_f = (-\infty, -1) \cup (2, +\infty)$ ✓

$\sqrt{x^2-1} \Rightarrow x^2 \geq 1 \Rightarrow II \Rightarrow (-\infty, -1] \cup [1, +\infty)$

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$-x^2 + 4x + 3 \geq 0$ با تراز اولان ۲ - باید منفی شود $\rightarrow -x^2 - 4x + 3 = 0 \Rightarrow a = -\frac{1}{2}$

$-x^2 - \frac{1}{2}x + 3 \Rightarrow (x + \frac{1}{2} - 3) \rightarrow (x + 2)(x - \frac{3}{2})$

$\frac{c}{a} \Rightarrow -3 = -2 \times b \Rightarrow b = \frac{3}{2}$

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

$a+b \Rightarrow -\frac{1}{2} + \frac{3}{2} = 1$ ✓

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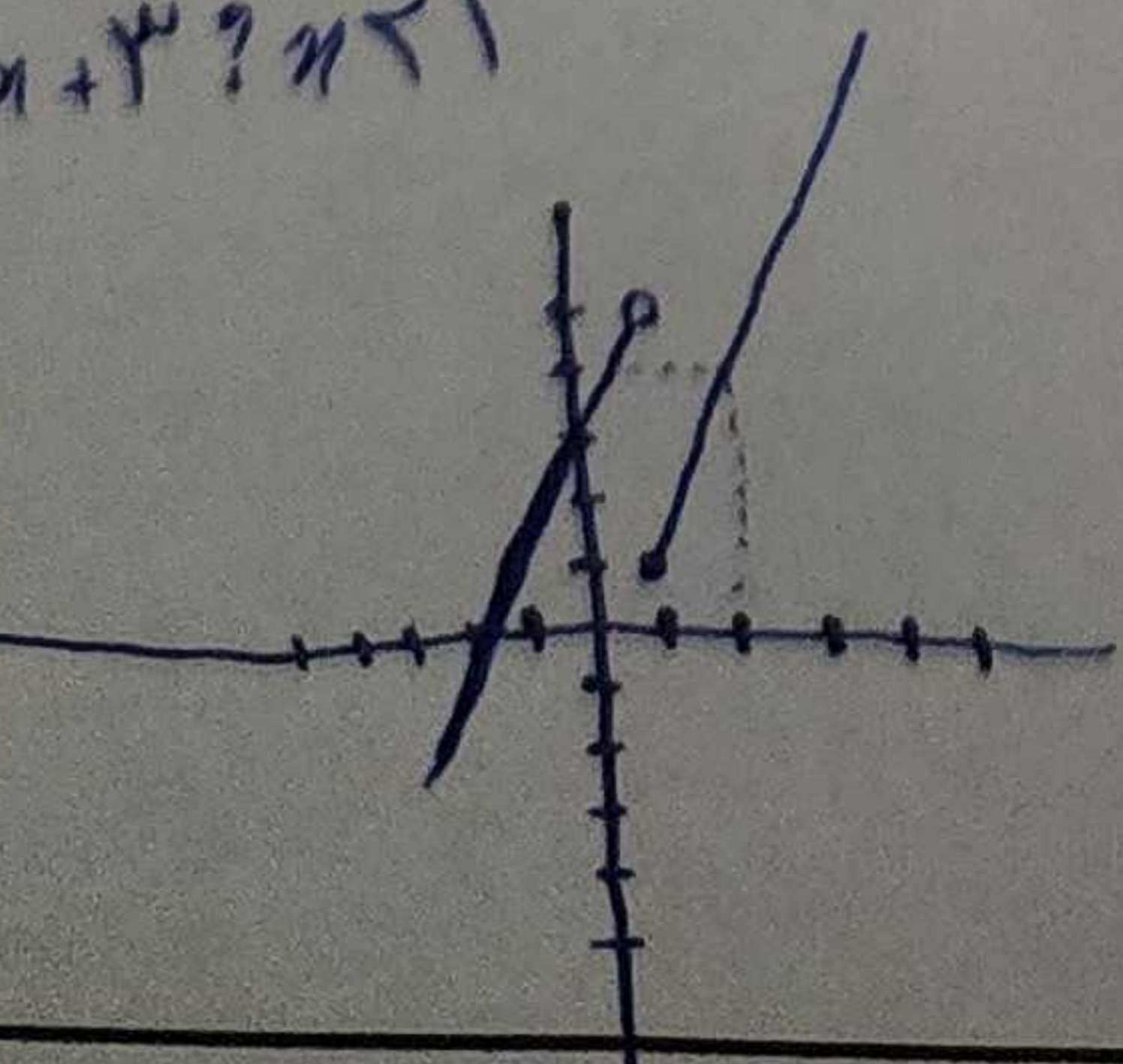
$f(x) \begin{cases} 2x-2 & x \geq 1 \\ 2x+3 & x < 1 \end{cases}$

$x \geq 1 \rightarrow$ در حالت ها که است
پس تمام $x \geq 1$ جز در این است

$x < 1 \rightarrow$ تا ۳ - که است و در
دامنه قرار دارد

$D_f = [-3, +\infty)$ ✓

(0, 3)
(-1, 1)
(-2, -1)



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$$2f(\omega) \Rightarrow 2(\sqrt{a} + \sqrt{b}) \rightarrow 1\sqrt{a} + 1\sqrt{b}$$

$$1\sqrt{a} + 1\sqrt{b} = \sqrt{a} - \sqrt{b}$$

$$f(-2) = \sqrt{a} - \sqrt{b}$$

$$1, a = -11$$

$$a = \frac{-11}{10} \checkmark$$

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$$\sqrt{2+\sqrt{3}} + \sqrt{2-\sqrt{3}} = a \Rightarrow a^2 = 2+\sqrt{3} + 2-\sqrt{3} + 2 \Rightarrow a^2 = 4 \quad a = \sqrt{4}$$

$$\frac{1}{\sqrt{2+\sqrt{3}}} + \frac{1}{\sqrt{2-\sqrt{3}}} = \frac{\sqrt{2-\sqrt{3}} + \sqrt{2+\sqrt{3}}}{2-\sqrt{3}} = \sqrt{2-\sqrt{3}} + \sqrt{2+\sqrt{3}} \Rightarrow \sqrt{4}$$

$$\sqrt{x} = \sqrt{4} \quad \frac{1}{\sqrt{x}} = \sqrt{4} \quad \sqrt{4} + \sqrt{4} + 2 + 2 \Rightarrow 4 + 2\sqrt{4} \checkmark$$

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$$2f(x) - 3f(-x) = 5x^2 - x$$

$$2 \left(\begin{aligned} 4f(-x) - 3f(x) &= 5x^2 + 1 \\ f(x) - 4f(-x) &= 12x^2 - 2x \\ -9f(x) + 9f(-x) &= 12x^2 + 3x \end{aligned} \right) \Rightarrow -5f(x) = 10x^2 + x$$

$$-5f(x) = 10x^2 + x \Rightarrow -5f(x) = 10x^2 + x$$

$$f(x) = \frac{10x^2 + x}{-5} \checkmark$$

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$$\text{if } x=0 \Rightarrow 2f(0) = (3m-1) \times 3$$

$$9m - 3 = 6m + 10$$

$$\text{if } x=-1 \Rightarrow 4f(0) = 14 + 2m + 3m - 1$$

$$7m = 14 \quad m = 2$$

$$f(0) \Rightarrow \frac{3m-1}{2} = 9, 2 \checkmark$$

2

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$$ax + b + \frac{a}{x} + b = 3x - 12 + \frac{12}{x}$$

$$(ax - 3x) + \left(\frac{a}{x} - \frac{12}{x}\right) + (2b + 12) = 0 \quad \text{که عبارت از 0 است}$$

$$a - 3 = 0 \Rightarrow a = 3$$

$$a - 3 = 0 \Rightarrow a = 3$$

$$2b + 12 = 0 \Rightarrow b = -6$$

$$f(x) = 3x - 6$$

$$f(-1) = -9 \checkmark$$

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