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تکلیف ۱۱

نام خانوادگی: ...

$x^2 - 4 \rightarrow$  معادلی

$12x - 20 \rightarrow$  معادلی (تکلیف)

$x \leq a \rightarrow 12a - 20 < a^2 - 4 \rightarrow$   
 $\Rightarrow a \in \mathbb{R} - [-2, 2]$

$a \in [-1, +\infty)$

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$f(x) = 3x + k$   
 $f^{-1}(2) = 4$

$x = 2 \rightarrow f(x) = 2 \rightarrow 3(2) + k = 2 \Rightarrow k = -10 \Rightarrow f(x) = 3x - 12$

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الف)  $f(v) = 3(v) - 12 = 12$

ب)  $3(3a - 12) - 12 = 9a - 48$

$f(a) = \frac{a^2}{a-1} = 2a$

اگر  $(2a, a)$  در دامنه باشد، پس  $(a, 2a)$  در رنج مستقر می‌باشد.

$\rightarrow a^2 = 2a^2 + 2a \Rightarrow -a^2 + 2a = 0 \Rightarrow a(a-2) = 0 \Rightarrow a \in \{0, 2\}$

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$f = \{(3, 5), (2, 7), (4, 9), (1, 4)\}$   
 $f^{-1} = \{(5, 3), (7, 2), (9, 4), (4, 1)\}$

$g = \{(3, 2), (1, 4), (9, 5)\}$   
 $g^{-1} = \{(2, 3), (4, 1), (5, 9)\}$

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الف)  $f \circ f^{-1} = \{(5, 5), (7, 7), (9, 9), (4, 4)\}$  ب)  $f^{-1} \circ f = \{(3, 3), (2, 2), (4, 4), (1, 1)\}$

ج)  $f \circ g^{-1} = \{(2, 5), (5, 4)\}$

د)  $g^{-1} \circ f = \{(3, 9), (7, 3), (9, 8)\}$

$g^{-1} = \{(1, 2), (3, 4), (5, 9)\}$

$f \circ g^{-1} = \{(1, 4), (3, 8), (5, 5)\}$  و  $h = \{(1, 2), (3, 4), (5, 9), (4, 1)\}$

$h \circ f \circ g^{-1} = \{(1, \frac{2}{3}), (3, \frac{4}{3}), (5, \frac{5}{3})\}$

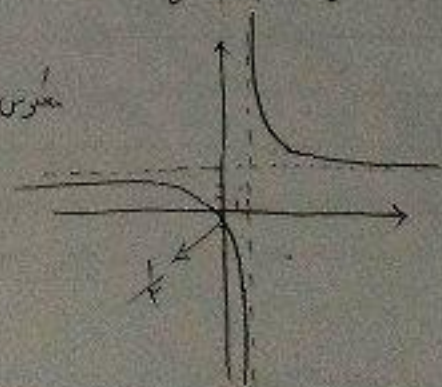
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$y = \frac{2x+1}{x-2}$

مجاورت قائم:  $x = 2$   
 مجاورت افقی:  $y = 2$

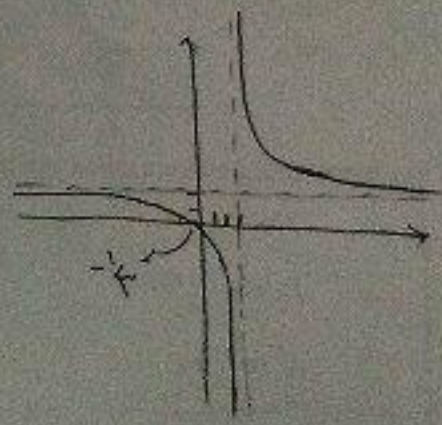
$x \rightarrow y = -\frac{1}{4}$

مجاورت افقی



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

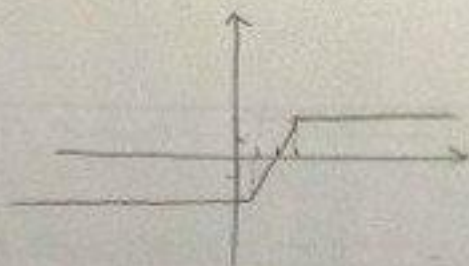
مجاورت قائم:  $x = 2$   
 مجاورت افقی:  $y = 2$   
 $x \rightarrow y = -\frac{1}{4}$



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$$\begin{cases} f & x > 1 \\ x-f & 1 < x \leq 1 \\ -f & x < 1 \end{cases}$$



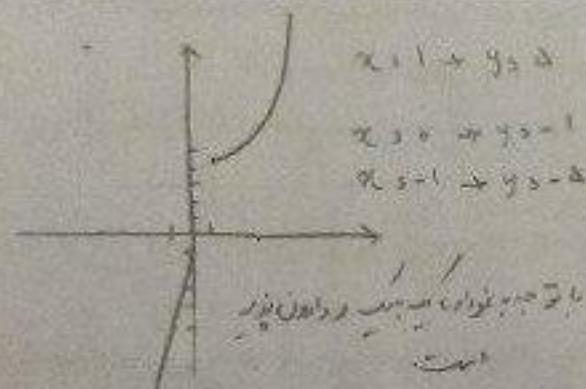
$$\Rightarrow [a, b] = [1, 1]$$

$$\text{مثلاً: } y = \ln x \rightarrow x = e^y = e$$

$$\Rightarrow \frac{x+f}{x} = y$$

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✓



$$x+1 = y > 1$$

$$x > 0 \rightarrow y > 1$$

$$x < -1 \rightarrow y < -1$$

$$\text{مثلاً: } y = x^2 + 1 \rightarrow x = y^2 + 1$$

$$\text{مثلاً: } -1 < x < y \rightarrow y = x^2 + 1$$

$$\Rightarrow y = \frac{x+1}{x} \Rightarrow x \leq 0$$

$$\Rightarrow \begin{cases} \sqrt{x-1} & x > 1 \\ \frac{x+1}{x} & x \leq -1 \end{cases}$$

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

$$\frac{1}{x} = x$$

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$$y = \frac{x}{x^2+1} \rightarrow x = \frac{y}{y^2+1} \rightarrow xy^2 - y + x = 0 \rightarrow x = \frac{1 \pm \sqrt{1-4y^2}}{2y}$$

$$1-4y^2 \geq 0 \Rightarrow |y| \leq \frac{1}{2} \rightarrow -\frac{1}{2} \leq y \leq \frac{1}{2} \Rightarrow \text{مثلاً: } y = \frac{1}{2}$$

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$$f(x) = \begin{cases} \frac{1 - \sqrt{1-4x^2}}{2x} & x > 0 \\ \frac{1 + \sqrt{1-4x^2}}{2x} & x < 0 \end{cases}$$