

نکته: بازه‌های مجزای A

نکته: بازه‌های مجزای B

11, 0

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الف)  $f(x) = \left(\frac{1}{x}\right)^{x-1} - 1$  باشد دامنه‌ی تعریف  $y = \sqrt{x^2 f(x+1)}$  را بیابید.

$f(x+1) = \left(\frac{1}{x+1}\right)^{x-1} - 1$

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

$D_f = [0, 1]$

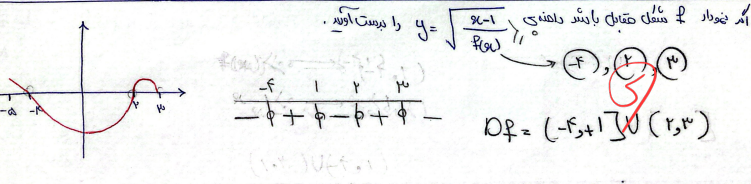
ب)  $f(x) = \sqrt{x+1} \sqrt{x+2}$  باشد دامنه‌ی تابع  $f(x)$  را بیابید.

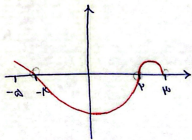
$f(-x) = \sqrt{-x+1} \sqrt{-x+2}$

(I)  $-x < 2 \rightarrow \sqrt{-x+2} > 0 \rightarrow x > -2$

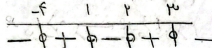
(II)  $-x < 1 \rightarrow \sqrt{-x+1} > 0 \rightarrow x > -1$

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





در نمودار  $f$  نقاطی را به دست آوریم که  $y = \sqrt{\frac{x-1}{f(x)}}$  را به دست آوریم.



$$D_f = (-f, +1] \cup (2, 3)$$

در دامنه تابع  $y_1 = \frac{1}{3x^2 + ax + b}$  را به دست آوریم.  $y_2 = \frac{1}{9x^2 + \sqrt{3x^2 + 1} - 10}$

$9x^2 - 9x^2 \rightarrow 9x^2(x^2 + 1) = (x+1)(x-1)$    
  $(3x^2 + x + \omega)(3x^2 - x + \omega) \Rightarrow 9x^4 + x^2(3\omega + 3\omega - 1) + x(\omega - \omega) = \text{...}$

$y = \frac{1}{3x^2 + ax + b}$

$(3x^2 + x + \omega)(3x^2 - x + \omega) \Rightarrow 9x^4 + x^2(3\omega + 3\omega - 1) + x(\omega - \omega) = \text{...}$

$(N) = 9x^4 - 17x^2 - 4x - 4 \Rightarrow (I) 3x^2 + 3\omega - 1 = -17 \quad (II) x - \omega = -4 \Rightarrow x = \omega - 4$

$(III) \omega\omega = -4 \quad (1) \begin{cases} a = -1 \\ b = -4 \end{cases} \Rightarrow \sqrt{-(-1)} = \sqrt{1} = 1 \Rightarrow \omega = 1 \Rightarrow \sqrt{-4} = 2$

در  $f(x) = x^2 + x$  به دست آوریم  $y = \sqrt{f(x) - f(\frac{1}{x})}$

$y = x^2 + x - ((\frac{1}{x})^2 + \frac{1}{x}) \Rightarrow x^2 + x - \frac{1}{x^2} - \frac{1}{x} = \frac{x^4 + x^3 - 1 - x}{x^2}$

$(x^2 - 1)(x^2 + 3x^2 + 1) \Rightarrow \text{...}$

$(I) |x| > 2 \rightarrow (+) \xrightarrow{\Delta < 0} x > 0 \rightarrow x > 2$

$(II) |x| < 2 \rightarrow (-) \xrightarrow{\Delta < 0} x < 0 \rightarrow -x < 0$

$(III) |x| = 2 \rightarrow (0) \rightarrow x \neq 0$

$D_f = [2, 0) \cup [2, +\infty)$

در  $f(x) = x^2 + x$  به دست آوریم  $y = \sqrt{f(x) - f(\frac{1}{x})}$

$$x=2 \rightarrow f(1+2) \Rightarrow V$$

$$x=1 \rightarrow f(1+1) \Rightarrow ?$$

دومى ۱.  $f(v) + f(10)$  چوڻى  $f(2x^2 + x) = 10x^2 - 1$  نى

$$V + 1 = 1$$

$$(I) 2x^2 + x = 10$$

$$\downarrow x=2$$

$$(II) 2x^2 + x = 1$$

$$\downarrow x=1$$

$$\rightarrow \frac{-2}{1} = -2$$

دومى ۲.  $\frac{g(\sqrt{v}) - v}{f(\sqrt{v+2})}$  چوڻى  $g(x) = 2x^3 + 9x^2 + 14x$  ،  $f(x) = x^3 - 9x^2 + 14x$  نى  
 $f(n) = (n-2) + 1$   $g(n) = (n+2) - 14$

$$g(t-2) = (t-2)^3 + 9(t-2)^2 + 14(t-2) = (t-2)((t-2)^2 + 9(t-2) + 14) =$$

$$(t-2)(t^2 - 4t + 4 + 9t - 18 + 14) = (t-2)(t^2 + 5t - 4) = t^3 - 2t^2 - 4t + 8$$

$$f(t-2) = (t-2)^3 - 9(t-2)^2 + 14(t-2) \Rightarrow (t+2)(t^2 + 4t + 4 - 9t - 18 + 14) =$$

$$(t+2)(t^2 - 5t - 4) = t^3 + 2t^2 - 5t^2 - 10t - 8 = t^3 - 3t^2 - 10t - 8$$

۳.  $g(x) = \sqrt{x-2} \sqrt{x-4}$  ،  $f(x) = \sqrt{x+2} \sqrt{x-4}$  نى

$$(g(x) + f(x))^2 \Rightarrow \frac{a+b}{c} \text{ چوڻى } f(x) + g(x) = a + b \sqrt{x+c}$$

$$\sqrt{x-2} \sqrt{x-4} + \sqrt{x+2} \sqrt{x-4} + \sqrt{x^2 - 14x + 4} \Rightarrow x + \sqrt{x-2} \sqrt{x-4} + \sqrt{x+2} \sqrt{x-4} + \sqrt{x^2 - 14x + 4}$$

$$\Rightarrow \sqrt{x^2 - 14x + 4} \xrightarrow{\text{دو}} \sqrt{x-2} \sqrt{x-4} = a + b \sqrt{x+c} \Rightarrow \begin{cases} a=0 \\ b=1 \\ c=-2 \end{cases}$$

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

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ب)  $g(x) = \{(2, 1), (1, 0), (0, 4), (3, 2)\}$ ,  $f(x) = \frac{x+2}{x^2-5x+4}$  9

$\left\{ \left(2, \frac{1}{-4}\right), \left(0, \frac{4}{1}\right) \right\} \rightarrow \left\{ \left(2, -\frac{1}{4}\right), (0, 4) \right\}$

$f(2) \Rightarrow \frac{4}{-1} = (-4)$

$f(0) \Rightarrow \frac{2}{4} \Rightarrow \left(\frac{1}{2}\right)$

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$\mathbb{R} - \{1, 4\}$

ج)  $g(x) = \{(-2, 3), (1, -1), (3, 2), (2, 0)\}$ ,  $f(x) = \{(1, 2), (3, -1), (2, 4), (-1, 4)\}$  10

الف)  $f(g(x)) \Rightarrow \left\{ \left(\frac{1}{2}, 2\right), \left(\frac{3}{2}, -1\right), (2, 2), \left(-\frac{1}{2}, 4\right) \right\}$

ب)  $f(g^2(x)) \Rightarrow \{(1, 2), (9, -1), (14, 2), (1, 4)\}$

ج)  $g^2(x) + 1 \Rightarrow \{(-2, 14), (1, 3), (3, 4), (-1, 1)\}$

د)  $\frac{f}{g} \Rightarrow \left\{ (1, -4), (3, -1), \left(-1, \frac{1}{0}\right) \right\}$  تعريف نسبه

ب) 10  $\left\{ \begin{array}{l} x^r = 1 \rightarrow x = \pm 1 \\ x^r = 2 \rightarrow x = \pm \sqrt{2} \\ x^r = 4 \rightarrow x = \pm 2 \\ x^r = -1 \rightarrow x \end{array} \right.$

$\rightarrow \left\{ (\pm 1, 2), (\pm \sqrt{2}, -1), (\pm 2, 2) \right\}$