

R10

آیلا مرزینا

$$y = \frac{x^2 + x + 2}{x+1} \rightarrow y(x+1) = x^2 + x + 2 \rightarrow x^2 + x + 2 - yx - y = 0$$

1
2

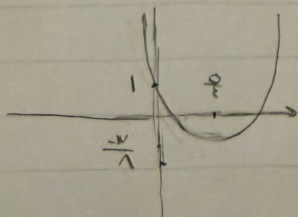
$$x^2 + (1-y)x + (2-y) = 0 \rightarrow \Delta = (1-y)^2 - 4(2-y) = y^2 - 4y - 7 \geq 0$$

$$y^2 - 4y - 7 \geq 0 \rightarrow (y+1)(y-7) \geq 0 \rightarrow y \in (-\infty, -1] \cup [7, +\infty)$$

$$y = 2x^2 - 5x + 1$$

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$$\rightarrow \frac{-b}{2a} = \frac{5}{4} \sim x_{ext} \rightarrow \frac{0}{14} - \frac{100}{14} + \frac{14}{14} = \frac{-94}{14} = \frac{-47}{7} \sim y_{ext}$$



$$R_f = [-\frac{47}{7}, +\infty)$$

$$(b) \sqrt{-x^2 + 4x - 5} \rightarrow \frac{-5}{2a} = \frac{-(34 - 16)}{-4} = 4 \rightarrow x = 4 \rightarrow y = 0$$

$$R_f = [0, 4]$$

$$y = \sqrt{x^2 - 3x + 4} \quad (c)$$

برای هر x در R، عبارت زیر رادیکال مثبت است $\rightarrow R_f = [0, +\infty)$

$$(d) \log(x^2 - 4x + 7x + 4)$$

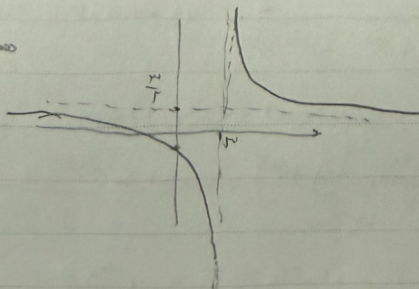
شرط (0, 4) دارد

برای هر x در R، عبارت زیر رادیکال مثبت است

$$\rightarrow R_f = (-\infty, +\infty) \sim \mathbb{R}$$

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

معمولی رانج

معمولی
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معمولی رانج و عیب قائم

$$\frac{c}{a} = \frac{1}{2}$$

$$R_f = R - \left\{ \frac{1}{2} \right\}$$

$$y = \sqrt{\frac{x+1}{x-4}}$$

$$R_f = [0, +\infty) - \left\{ \frac{1}{2} \right\}$$

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$$y = \frac{x^2+2}{\sqrt{x^2+3}}$$

$$\frac{x^2+2}{\sqrt{x^2+3}} \rightarrow \frac{x}{\sqrt{x}} \rightarrow \frac{x\sqrt{x}}{x}$$

$$R_f = \left[\frac{x\sqrt{x}}{x}, +\infty \right)$$

معمولی رانج و عیب

فقط فرم

$$\frac{ax+b}{cx+d}$$

$$\frac{1}{\sqrt{x^2+3}} \rightarrow \frac{1}{\sqrt{x^2+3}}$$

رای توان از این روش است

$$y = x^2 + \frac{1}{x^2+4}$$

$$\frac{1}{x^2+4} \rightarrow \frac{1}{x^2+4}$$

$$R_f = \left[\frac{1}{4}, +\infty \right)$$

$$R_f = \left[\frac{1}{4}, +\infty \right)$$

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معمولی رانج و عیب

$$\left(x^2 + 4 + \frac{1}{x^2+4} \right) - 4$$

$$R_f = \left[\frac{1}{4}, +\infty \right)$$

$$\frac{1}{x^2+4} \rightarrow \frac{1}{x^2+4}$$

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

$$\frac{x^2+2}{x^2-1} \rightarrow \frac{x^2+2}{x^2-1}$$

$$R_f = (-\infty, -4] \cup (4, +\infty)$$

1

یک بار هم باید به خط روش اصلی به دست آورید

$$y = \frac{p \sin x - 1}{\sin x + p} \xrightarrow{\text{I}} y(\sin x + p) = p \sin x - 1$$

$$y \sin x + p y = p \sin x - 1 \rightarrow (y - p) \sin x = -1 - p y$$

$$\sin x = \frac{-1 - p y}{y - p} \quad (y \neq p) \rightarrow -1 \leq \frac{-1 - p y}{y - p} \leq 1 \sim y \neq p$$

$$\frac{-1 - p y}{y - p} \geq -1 \rightarrow -1 - p y \geq p y - y \rightarrow y \geq -p$$

$$\frac{-1 - p y}{y - p} \leq 1 \rightarrow -1 - p y \leq y - p \rightarrow y \geq \frac{1}{p} \rightarrow R_f = \left[-p, \frac{1}{p}\right]$$

$$\text{II} \rightarrow \frac{\sin x = 1}{p \neq 0} \rightarrow \frac{p - 1}{1 + p} \leq \frac{1}{p}$$

$$\sin x = -1 \rightarrow \frac{-p - 1}{-1 + p} \geq \frac{1}{p} \rightarrow R_f = \left[-p, \frac{1}{p}\right]$$

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

$$x^2 - x + 1 \sim (\Delta, \sqrt{1 - 4}) \times \rightarrow (\text{مواقع حرجية}) \rightarrow D_f = \mathbb{R}$$

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

$$\rightarrow (1 - y)x^2 + (y - 1)x + \left(\frac{1}{x} - y\right) = 0 \rightarrow x = \frac{(y - 1) \pm \sqrt{5}}{y(1 - y)}$$

$$1 - y \neq 0 \rightarrow y \neq 1 \rightarrow (y - 1)(y - 1 - y + 1) = -y(y - 1) > 0$$

$$-\frac{1}{y} < x < \frac{1}{y}$$

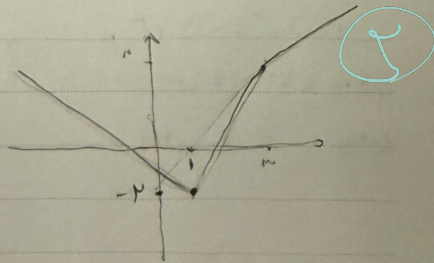
$$R_f = [0, 1]$$

(الف)

$$y = |x-1| + |x-3|$$

$$\begin{array}{ccc} & 1 & 3 \\ -x+1+x-3 & x-1+x-3 & x-1-x+3 \\ -x-1 & 2x-2 & -x+1 \end{array}$$

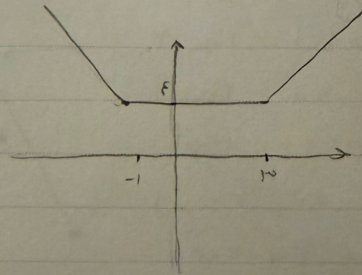
$$R_f = [-1, +\infty)$$



$$y = |x-1| + |x+1|$$

$$\begin{array}{ccc} & -1 & 1 \\ -x+1-x-1 & -x+1+x+1 & x-1+x+1 \\ -x-1 & 2 & x-1 \end{array}$$

$$R_f = [1, +\infty)$$



$$|x-1| - |x+1| \leq 1$$

$$\begin{array}{ccc} & -1 & 1 \\ -x+1-x-1 & -x+1-x+1 & x-1-x+1 \\ -x-1 & 2 & x-1 \end{array}$$

$$\begin{array}{ccc} x+1 \leq 1 & -x \leq 1 & -x-1 \leq 1 \\ x \leq -1 & x \geq -1 & -x \leq 0 \\ & x \geq -\frac{1}{x} & x \geq -0 \checkmark \end{array}$$

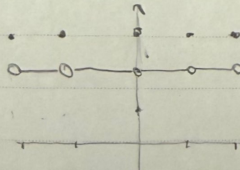
$$\rightarrow R_f = (-\infty, -1] \cup [-\frac{1}{x}, +\infty)$$

الف) $[x] + [x - n]$

$[x] + [x - n] = n$

$x \in \mathbb{Z} \rightarrow n (0, n)$

$x \in \mathbb{Z} \rightarrow n (-1, n)$



$R_f = \{n, n\}$

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ب) $y = [x] - [x]$

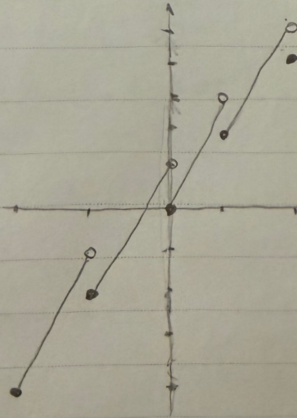
$-1 \leq x < 0 \rightarrow [x] = -1$

$0 \leq x < 1 \rightarrow [x] = 0$

$1 \leq x < 2 \rightarrow [x] = 1$

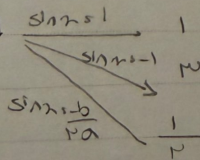
$2 \leq x < 3 \rightarrow [x] = 2$

$x = 3 \rightarrow 4 - 3 = 1$



$R_f = [-1, 0)$

ج) $y = \sin^2 x - \sin x + 1$

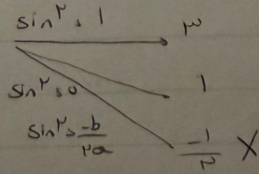


$R_f = [1/4, 1]$

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2

د) $y = \sin^2 x + \sin^2 x + 1$



$R_f = [1, 2]$