

$$\begin{cases} f(-n) - n f(n) = 2(n+1) \xrightarrow{n \rightarrow -n} -n f(-n) + n^2 f(n) = 2(n+1) - n \\ f(n) + n f(-n) = 2(n+1) \end{cases}$$

$$f(n)(1+n^2) = 2(n+1) + 1 - n \rightarrow f(n) = \frac{2(n+1)(-n+1) + 1 - n}{(1+n^2)} \quad f_{\text{عم}} = \frac{(1-n)(2(n+1)+1)}{1+n^2}$$

$$f(x) + f(0) = x^2 - 3x + 4$$

$$x=0 \rightarrow 2f(0) = 4 \rightarrow f(0) = 2 \rightarrow f(n) = x^2 - 3x + 3$$

$$f(n^2) = x^2 - 3x + 3$$

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

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

$$(1-y)^2 - 4(y+2) \geq 0 \quad y^2 - 4y - 7 \geq 0 \quad \Delta = 16 + 28 = 44 \quad R = (-\infty, -1] \cup [7, +\infty)$$

$$y = \sqrt{x^2 + 4x + 4} \quad \begin{cases} x_{\min} = \frac{-b}{2a} = \frac{-4}{2} = -2 \\ y_{\min} = 2 \end{cases}$$

$$R = [-2, +\infty) = [2, +\infty)$$

$$y = \log(x^2 - 4x + 5)$$

$$R = (-\infty, +\infty)$$

$$x_{\min} = \frac{-b}{2a} = \frac{0}{2} = 0$$

$$y_{\min} = \frac{-14}{1} = -14$$

$$R = [-14, +\infty)$$

$$y = \sqrt{x^2 - 12x + 17}$$

$$R = [0, +\infty)$$

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

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

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

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

$$x^2 + \frac{1}{x^2} - 2 \xrightarrow{\min x^2 = 0} \left[2 + \frac{1}{2} + \infty \right) = \left[\frac{5}{2}, +\infty \right) - 2 = \left[\frac{1}{2}, +\infty \right)$$

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

$$R = \left[\frac{2}{\sqrt{2}}, +\infty \right)$$

$$y = \frac{x^2 + 4}{x^2 - 1} \rightarrow -\infty \quad R = (-\infty, -1] \cup (1, \infty)$$

ی رانده هفت می شود

منه نه مقدر به نایب به هم میسه

$$y = \frac{x^2 + 4}{x^2 - 1} \rightarrow -\infty \quad R = (-\infty, -1] \cup (1, \infty)$$

ی رانده هفت می شود

منه نه مقدر به نایب به هم میسه

(1, 2)

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$$f(x) = \frac{x \sin x + 4}{x \sin x - 4} \quad \begin{cases} \frac{1}{x} \\ -x \end{cases} \quad [-3, \frac{1}{x}]$$

خروجی رانده هفت می شود

(۲)

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$$y = \sqrt{\frac{9x-18}{-1+x}} = \sqrt{\frac{9(x-2)}{-(1-x)}} = \sqrt{\frac{9}{x}} = \frac{3}{\sqrt{x}}$$

$R = \left\{ \frac{3}{\sqrt{x}} \right\}$

$y = \left| \frac{x-1}{x} \right|$

$R = [0, \infty)$

(الف)

(۲)

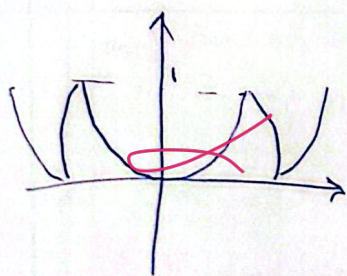
۸

$$y = \begin{cases} x^2 - 2x & x \neq 0 \\ 0 & x = 0 \end{cases}$$

$R = (-\infty, 1] \cup [-1, \infty) = R$

(۲)

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مرحله به مرحله پیش!

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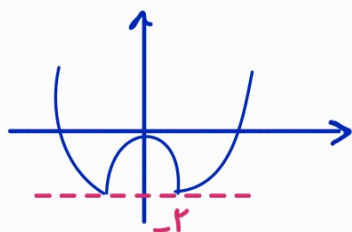
۵- برد توابع همبند است $\mathbb{R} - \{\frac{a}{c}\}$

الف $R_y = \mathbb{R} - \{\frac{3}{2}\}$

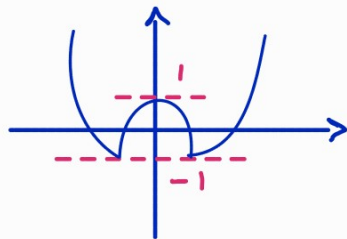
ب $R_y = \sqrt{\mathbb{R} - \{4\}} = [0, +\infty) - \{2\}$

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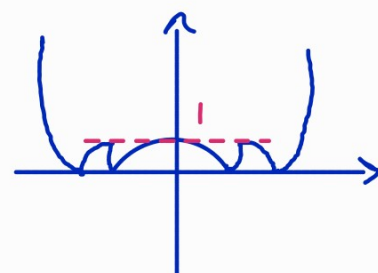
نکته: $\square = x^2 \rightarrow \begin{cases} x^2 = 0 \rightarrow y = -4 \\ x^2 \sim \infty \rightarrow y = 3 \end{cases} \xrightarrow[\text{محدوده}]{\text{محدوده میوه}} R_y = (-\infty, -4] \cup (3, +\infty)$



$y = f(1-x)$



$y = f(|x|) + 1$



$y = |f(|x|) + 1|$

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