

$$\begin{aligned} f(-x) - x f(x) &= 2|x| + 1 \\ -x \rightarrow f(x) + x f(-x) &= 2|x| + 1 \\ x \rightarrow (-x f(x) + f(-x)) &= 2|x| + 1 \end{aligned}$$

$$\begin{cases} f(x) + x f(-x) = 2|x| + 1 \\ x^2 f(x) - x f(-x) = -2|x| - x \end{cases}$$

(2)

(1)

$$\begin{aligned} f(x) + x^2 f(x) &= 2|x| + 1 - 2|x| - x \\ (1 + x^2) f(x) &= 2|x| (1 - x) + (1 - x) \\ f(x) &= \frac{(1-x)(2|x|+1)}{(1+x^2)} \end{aligned}$$

$$f(x) + f(0) = x^2 - 2x + 1$$

$$x \rightarrow 0 \rightarrow f(0) + f(0) = 1 \rightarrow 2f(0) = 1 \rightarrow f(0) = \frac{1}{2}$$

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

$$f(x^2) = x^4 - 2x^2 + \frac{1}{2}$$

(2)

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

$$\Delta = (1-y)^2 - 4(y+2) = 1 - 2y + y^2 - 4y - 8 = y^2 - 6y - 7 \geq 0 \rightarrow (y-7)(y+1) \geq 0$$

$$\frac{-1}{+1} \quad \frac{7}{-1} \quad R = (-\infty, -1] \cup [7, +\infty)$$

(2)

(1)

$$1) y = 2x^2 - 4x + 1 \quad \left| \begin{array}{l} \frac{-b}{2a} = \frac{2}{2} \\ \Delta = \frac{16}{4} \end{array} \right.$$

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

$$2) y = \sqrt{-x^2 + 2x - 5} \quad \left| \begin{array}{l} \frac{-b}{2a} = 1 \\ \Delta = -16 \end{array} \right.$$

$$y = \sqrt{(-\infty, 1]} \rightarrow R = [0, 1]$$

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$$3) \sqrt{x^2 - 2x^2 + 4x + 1} = \sqrt{1R} \rightarrow R = [0, +\infty)$$

$$4) y = \sqrt{(x^2 - 4x^2 + 4x + 1)} \quad \left| \begin{array}{l} \frac{-b}{2a} = \frac{1}{2} \\ \Delta = \frac{1}{4} \end{array} \right.$$

$$R = \mathbb{R}$$

$$5) y = \frac{2x+1}{x-2} \rightarrow R = \mathbb{R} - \{\frac{2}{3}\}$$

$$6) y = \sqrt{\frac{2x+1}{x-2}} = \sqrt{t} \rightarrow R = [0, +\infty) \cup \{\frac{2}{3}\}$$

$$7) y = \frac{x^2 + 1}{\sqrt{x^2 + 1}} = \sqrt{x^2 + 1} + \frac{1}{\sqrt{x^2 + 1}}$$

$$8) y = x^2 + 1 + \frac{1}{x^2 + 1} - 1$$

(2)

(1)

$$R = [\sqrt{2} + \frac{1}{\sqrt{2}}, +\infty)$$

$$x=0 \rightarrow 1 + \frac{1}{1} - 1 = 1$$

$$R = [\frac{1}{2}, +\infty)$$

$$\text{دو } \frac{x^2 + c}{x^2 - 1} = y \rightarrow x^2 = -\frac{y - c}{y + c} \quad (\text{شرایط})$$

$$\rightarrow x = \pm \sqrt{\frac{y + c}{y - c}} \quad \frac{-c}{-1} \quad \frac{c}{-1}$$

$$R = (-\infty, -c] \cup (c, +\infty)$$

$$y = \frac{x^2 + c}{x^2 - 1} \quad \begin{matrix} \infty \rightarrow c \\ 0 \rightarrow -c \end{matrix}$$

$$R = (-\infty, -c] \cup (c, +\infty)$$

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$$y = \frac{x \sin x + c}{\sin x - c} \quad \begin{matrix} 1 \rightarrow -c \\ -1 \rightarrow -\frac{1}{c} \end{matrix}$$

$$R = [-c, -\frac{1}{c}]$$

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$$\text{الف) } y = \left| \frac{x-1}{c-x} \right| \rightarrow \frac{x}{c}$$

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

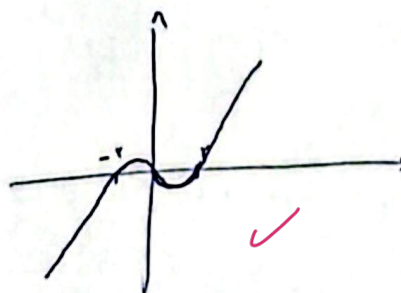
$$y = \sqrt{\frac{9x-18}{-1+c-x}} \rightarrow x = \frac{-c \pm \sqrt{1-c}}{1+y+9}$$

$$-1y-9=0 \rightarrow y = -\frac{9}{1}$$

$$R = (-\infty, -9) \cup (-9, +\infty)$$

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(۸)

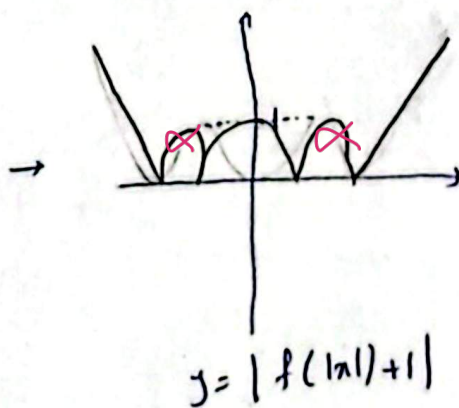
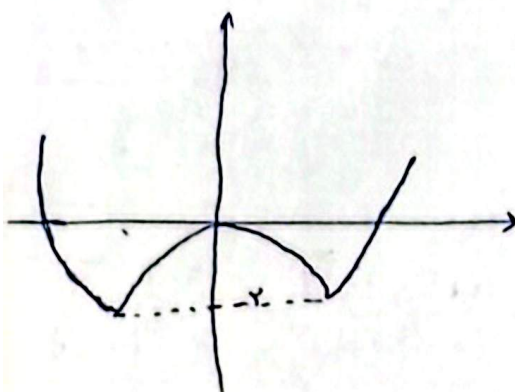
$$y = x|x| - x^2 \quad \begin{cases} x^2 - x & x \geq 0 \\ -x^2 - x & x < 0 \end{cases}$$



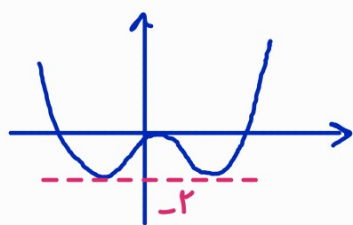
$$R = \mathbb{R}$$

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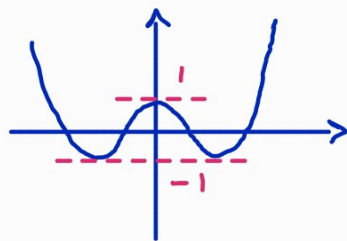
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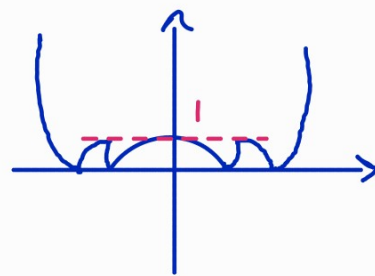
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$$y = f(|x|)$$



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



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

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