

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

$$\begin{aligned} f(x) + f(0) &= x^2 - cx + 4 \\ x=0 &\Rightarrow 2f(0) = 4 \Rightarrow f(0) = 2 \\ f(x) + 2 &= x^2 - cx + 4 \Rightarrow f(x) = x^2 - cx + 2 \Rightarrow f(x^2) = x^4 - cx^2 + 2 \end{aligned}$$

$$\begin{aligned} y &= \frac{x^2 + x + 2}{x-1} \Rightarrow yx - y = x^2 + x + 2 \Rightarrow x^2 + x - yx + 2 + y = 0 \\ x^2 + (1-y)x + 2+y &= 0 \quad \begin{cases} \text{I} \\ \text{II} \end{cases} \quad \begin{cases} \text{III} \\ \text{IV} \end{cases} \\ \Delta \geq 0 &\Rightarrow (1-y)^2 - 4(1)(2+y) \geq 0 \Rightarrow 1 + y^2 - 2y - 8 - 4y \geq 0 \Rightarrow y^2 - 6y - 7 \geq 0 \end{aligned}$$

$$\begin{aligned} 1) \quad x^2 - 5x + 1 &= 0 \quad \begin{cases} \rightarrow y = \sqrt{-x^2 + 4x - 5} \\ \text{ex} \begin{vmatrix} 5 \\ -14 \\ 1 \end{vmatrix} \\ \left[\frac{-14}{1}, +\infty \right) \end{cases} \\ 2) \quad y = \sqrt{x^2 - 2x^2 + 4x + 1} &\quad \begin{cases} R = \mathbb{R} \\ \sqrt{\quad} = [0, +\infty) \end{cases} \\ 3) \quad y = \log(x^2 - 4x^2 + 4x + 2) &\quad \begin{cases} \log(\quad) \\ R = (-\infty, +\infty) \end{cases} \end{aligned}$$

$$\begin{aligned} 1) \quad y = \frac{x^2 + 1}{x^2 - 2} &\quad \begin{cases} R = \left\{ \frac{3}{2} \right\} \\ \left[\frac{11}{2}, +\infty \right) \end{cases} \\ 2) \quad y = \sqrt{\frac{4x+1}{x-2}} &\quad \begin{cases} R = \{4\} \\ [0, +\infty) - \{2\} \end{cases} \\ 3) \quad y = \frac{x^2 + 4}{\sqrt{x^2 + 3}} &\quad \begin{cases} \frac{(\sqrt{x^2 + 3})(\sqrt{x^2 + 3}) + 1}{\sqrt{x^2 + 3}} \\ \sqrt{x^2 + 3} + \frac{1}{\sqrt{x^2 + 3}} \end{cases} \\ 4) \quad y = x^2 + \frac{1}{x^2 + 4} &\quad \begin{cases} \frac{1}{0+4} = \frac{1}{4} \\ \left[\frac{1}{4}, +\infty \right) \end{cases} \end{aligned}$$

$y = \frac{3x^2 + 4}{x^2 - 1}$ $\frac{1}{x^2 - 1}$ $\cdot \begin{cases} x^2 \rightarrow 0 : -4 \\ \quad \quad \quad (-\infty, -1] \cup (1, +\infty) \\ x^2 \rightarrow +\infty : 3 \end{cases}$ مخرج 3 و 1 من 3 و 1	$y = \frac{3x^2 + 4}{x^2 - 1} \rightarrow$ $\frac{1}{x^2 - 1}$ $yx^2 - y = 3x^2 + 4 \Rightarrow 3x^2 - yx^2 = -y - 4$ $x^2(3 - y) = -y - 4 \Rightarrow x = \sqrt{\frac{y+4}{y-3}}$ $\frac{-4}{3} \quad \frac{3}{1}$ $\frac{1}{x^2 - 1}$ $R = (-\infty, -1] \cup (1, +\infty)$
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$\frac{2 \sin x - 1}{\sin x - 2}$ $-1 \leq \sin x \leq 1$ $\begin{cases} \sin x = 1 : \frac{-2}{-1} = 2 \\ \sin x = -1 : \frac{-4}{-3} = \frac{4}{3} \end{cases}$ مخرج 3 و 1 من 3 و 1	$[\frac{4}{3}, 2]$
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$y = \left \frac{3x - 1}{x} \right $ $R_f = [0, +\infty)$	$\Rightarrow y = \sqrt{\frac{9x - 18}{x^2 - 1}}$ $\frac{9x - 18}{x^2 - 1} \xrightarrow{\text{مخرج 3 و 1}} \frac{9}{x} \cdot \frac{(x - 2)}{x - 1} = \frac{9}{x}$ $\sqrt{\frac{9}{x}} = \left\{ \frac{3}{\sqrt{x}} \right\}$
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$y = x(x - 2)$ $R = R \cup \emptyset$	9
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$y = f(x) + 1 $ $f(x)$ $f(x)$ $f(x) + 1$ $f(x) + 1$	10
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