

$$f(-x) - x f(x) = 2|x| + 1 \quad x f(-x) - x^2 f(x) = 2|x| + x$$

(۲) ①

$$f(x) + x f(-x) = 2|x| + 1 \quad f(x) + x f(-x) = 2|x| + 1$$

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

$$f(x) + f(0) = x^2 - 2x + 2 \quad f(0) = 2 \Rightarrow f(x) = x^2 - 2x + 2$$

(۲) ②

$$f(x) = x^2 - 2x + 2 \Rightarrow f(x^2) = x^4 - 2x^2 + 2$$

$$yx - y = x^2 + x + 2 \Rightarrow x^2 + (1 - y)x + 2 + y = 0$$

(۲) ③

$$(1 - y)^2 - 4(2 + y) = 1 - 4y + 4y^2 - 8 - 4y = 4y^2 - 8y - 7 > 0 \quad (y - 4)(y + 1) > 0$$

$$x = \frac{y - 1 \pm \sqrt{y^2 - 4y - 7}}{2} \geq 0$$

$$R_f = (-\infty, -1] \cup [7, +\infty)$$

$$x = y = 2n^2 - 2n + 1 \Rightarrow \frac{-\Delta}{2a} = \frac{20 - 2(2)(1)}{2} = -1 \quad R = [-1, +\infty)$$

(۲) ④

$$\Rightarrow \sqrt{x^2 + 4x - 5} \Rightarrow \frac{-\Delta}{2a} = \frac{16 - 4(-1)(-5)}{-2} = \frac{-4}{-2} = 2 \quad R = [2, +\infty)$$

$$\Rightarrow \log(x^2 - 4x + 5) \Rightarrow x^2 - 4x + 5 > 0 \quad R = \mathbb{R}$$

$$x = y = \frac{2n+1}{2n-1} \Rightarrow 2xy - 4y = 2n+1 \Rightarrow x(2y-2) = 2n+1 \Rightarrow x = \frac{2n+1}{2y-2} \quad R = \mathbb{R} \setminus \{1\}$$

(۲) ⑤

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

$$R_f = \left[\frac{4\sqrt{2}}{3}, +\infty \right)$$

$$\Rightarrow x + \frac{1}{x^2 + 2} = \frac{1}{x^2 + 2} - 2 \quad R = \left[\frac{1}{2}, +\infty \right)$$

$$y = \frac{r^n r + 2}{r^n - 1} \quad \text{for } r^n \neq 1 \Rightarrow y r^n - y = r^n r + 2 \Rightarrow r^n (y - r) = y + 2 \Rightarrow r = \sqrt[n]{\frac{y+2}{y-r}} \quad (6)$$

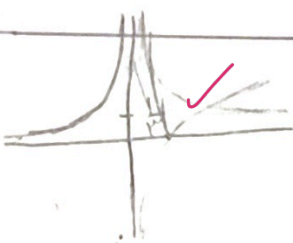
$$R = (-\infty, -2] \cup (r, +\infty) \quad (r)$$

for $r^n = 1$, $x=0 \rightarrow y=-2$
 $x=+\infty \rightarrow y=r$
 نمره منفی
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$$f(x) = \frac{r \sin x + 2}{\sin x - r}$$

$\sin x = 1 \rightarrow y = -r$
 $\sin x = -1 \rightarrow y = -\frac{1}{r}$

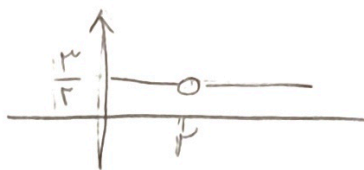
$$R_f = [-r, -\frac{1}{r}] \quad (r)$$

$$y = \left| \frac{r^n - 1}{2n} \right|$$


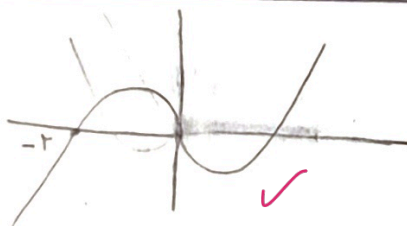
$$R = [0, +\infty) \quad (r)$$

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

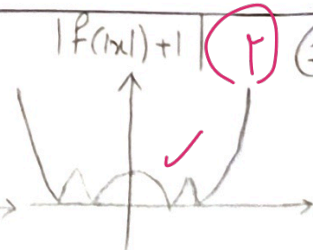
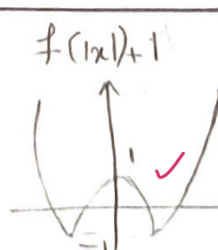
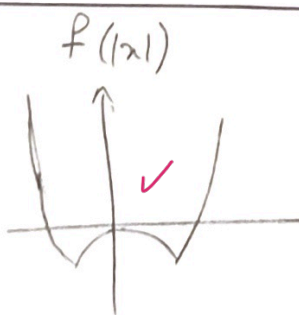
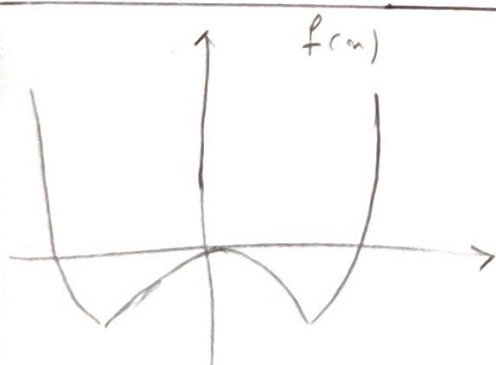
$$R = \left\{ \frac{q}{2} \right\} \quad (r)$$



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



$$R_f = \mathbb{R} \quad (r)$$



$$(r) \quad (1)$$