

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

$$2) f(x) + f(0) = x^2 - 2x + 4 \xrightarrow{x=0} f(0) + f(0) = 0 - 0 + 4, 4 \rightarrow f(0) = 2 \\ f(x) + 2 = x^2 - 2x + 4 \rightarrow f(x) = x^2 - 2x + 2 \rightarrow f(x^2) = x^4 - 2x^2 + 2$$

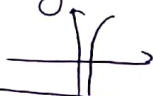
$$3) y = \frac{x^2 + x + 1}{x - 1} \rightarrow y(x-1) = x^2 + x + 1 \rightarrow x^2 + (1-y)x + 1 + y = 0 \\ x = \frac{y-1 \pm \sqrt{\Delta}}{1} \rightarrow \Delta = (y)^2 - 4(1+y) = y^2 - 4y - 4 = y^2 - 4y - 4 \\ \Delta \geq 0 \rightarrow y^2 - 4y - 4 \geq 0 \rightarrow (y-2)(y+2) \geq 0 \rightarrow y \in (-\infty, -2] \cup [2, +\infty)$$

$$4) \text{ الف) } y = x^2 - 2x + 1 \text{ ext } \left| \frac{dy}{dx} = 2x - 2 \right| \rightarrow y = \left[\frac{1}{x}, +\infty \right)$$

$$ب) y = \sqrt{-x^2 + 4x - 5} \text{ ext } \left| \frac{dy}{dx} = \frac{-2x+4}{2\sqrt{-x^2+4x-5}} \right| \rightarrow y = \left[\frac{1}{x}, +\infty \right)$$

$$ج) y = \sqrt{x^2 - 2x + 1} \text{ ext } \left| \frac{dy}{dx} = \frac{2x-2}{2\sqrt{x^2-2x+1}} \right| \rightarrow y = [0, +\infty)$$

$$د) y = \log(x^2 - 2x + 1) \text{ ext } \left| \frac{dy}{dx} = \frac{2x-2}{x^2-2x+1} \right| \rightarrow y = (-\infty, +\infty)$$



$$5) y = \frac{x+1}{x-1} \text{ ext } \left| \frac{dy}{dx} = \frac{2}{(x-1)^2} \right| \rightarrow y = \left[\frac{1}{x}, +\infty \right)$$

$$ب) y = \sqrt{\frac{x+1}{x-1}} \text{ ext } \left| \frac{dy}{dx} = \frac{1}{\sqrt{x^2-1}} \right| \rightarrow y = [1, +\infty)$$

$$ج) y = \frac{x^2+1}{\sqrt{x^2+1}} = \sqrt{x^2+1} \text{ ext } \left| \frac{dy}{dx} = \frac{x}{\sqrt{x^2+1}} \right| \rightarrow y = \left[\frac{1}{x}, +\infty \right)$$

$$د) y = x^2 + \frac{1}{x^2+1} \rightarrow x^2 + \frac{1}{x^2+1} - x \rightarrow y = \left[\frac{1}{x}, +\infty \right)$$

$$y_{x^r} - y - \frac{1}{2}x^r + r \rightarrow x^r(y-r), \quad y+r \rightarrow \frac{y+r}{y-r} \cdot x^r$$

[illegible]

$$y \sin x - ry, r \sin x + r \rightarrow \sin x (y - r) + ry + r$$

$$\sin \lambda \geq \frac{y+r}{y-r} \rightarrow 1 \geq \frac{y+r}{y-r} \geq -1 \rightarrow \begin{cases} \frac{y+r}{y-r} \geq 1 \rightarrow \frac{y+r-y-r}{y-r} \rightarrow \frac{-2r}{y-r} \rightarrow \frac{-r}{\frac{y}{2}-r} \rightarrow E(r, y) \\ \frac{y+r}{y-r} \geq -1 \rightarrow \frac{y+r+y-r}{y-r} \geq 0 \rightarrow \frac{y+r}{y-r} \geq 0 \rightarrow \frac{1}{\frac{y}{2}-r} \rightarrow (-\frac{1}{r}] \end{cases}$$

$$\} \rightarrow [-1, \frac{1}{r}]$$

$\wedge) \text{ wir } y = \left| \frac{r_{n-1}}{r_n} \right|$
 $y \in [0, +\infty)$

$$b) y = \sqrt{\frac{9n-11}{-1+15n}} = \sqrt{\frac{9(2-1)}{1+15(2)}} = \frac{y}{x} \quad R = \left\{ \frac{y}{x} \right\}$$

9) $y \sin x - y_n$ 

