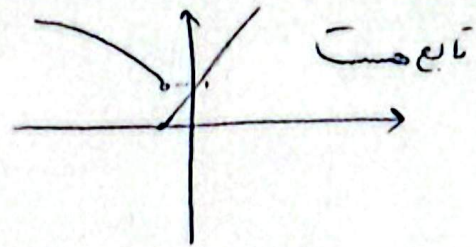
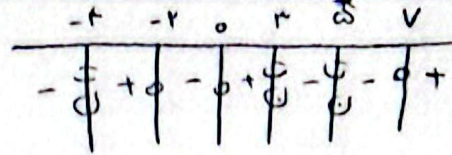


$$x = \begin{cases} 2y-1 & y \geq 0 \\ -y^2 & y < 0 \end{cases} \Rightarrow y = \begin{cases} \frac{x+1}{2} & y \geq 0 \\ \sqrt{-x} & y < 0 \end{cases}$$



①

$x \xrightarrow{0 \leq x < 2} f(x) = 2x-1$ $x \xrightarrow{x \geq 2} f(x) = -x^2$ $\Delta + \tau = V$
 $\Delta = -1, \tau = 2, V = 2$
 $g(u) = \sqrt{\frac{u f(u-1)}{f(u)}}$
 $D_g = (-1, 2) \cup [0, 2) \cup [2, +\infty)$



②

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

③

الف) $D_f = \mathbb{R} - \{0, \pm 2\}$

ب) $f(u) \geq 0$ $\frac{-2}{-} \frac{0}{+} \frac{2}{-}$ $D_f = (-2, 0) \cup (2, +\infty)$

الف) $y = \sqrt{\frac{u-2}{u^2-u-2}} = \sqrt{\frac{u-2}{(u-2)(u+2)}} = \sqrt{\frac{1}{u+2}}$
 $\frac{-2}{-} \frac{+}{+} \frac{+}{+}$ $D_y = (-2, 2) \cup (2, +\infty)$

④

ب) $y = \frac{2u^2+1}{2-2[-u]}$

$2-2[-u] \neq 0 \Rightarrow 2[-u] \neq 2 \Rightarrow [-u] \neq 1$
 $\frac{0 \leq u < 2}{2 \leq u < 4} \Rightarrow 2 \leq -u < 4 \Rightarrow -4 < u \leq -2$

$D_y = \mathbb{R} - (-2, -2]$

الف) $f(u) = \frac{\sqrt{u(u-1)}}{\sqrt{|u+u|}}$

① $u(u-1)(u+1) \geq 0$ $\frac{-}{+} \frac{0}{+} \frac{+}{-} \frac{+}{+} \rightarrow [-1, 0] \cup [1, +\infty)$ ⑤
 ② $|u+u| \geq 0$ $(0, +\infty)$
 $\frac{+}{0 \leq u < 2} \frac{+}{u \geq 2}$

① ② $D_f = [1, +\infty)$

$|u-1| \neq 0 \Rightarrow |u| \neq 1 \Rightarrow u \neq \pm 1$ ①

ب) $f(u) = \frac{\sqrt{|u-1-u^2|}}{|u|-1}$

$|u-1-u^2| \geq 0$

$\frac{-}{-} \frac{+}{+} \frac{+}{+} \frac{-}{-} \frac{+}{+} \frac{-}{-}$
 $-(u^2+u-1) \geq 0$
 $-(u+1)(u-1) \geq 0$

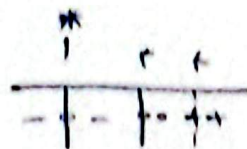
$\frac{-}{-} \frac{+}{+} \frac{+}{-} \frac{-}{-} \rightarrow [-2, 1]$ ②

① ② $D_f = [-2, 1) - \{-1\}$

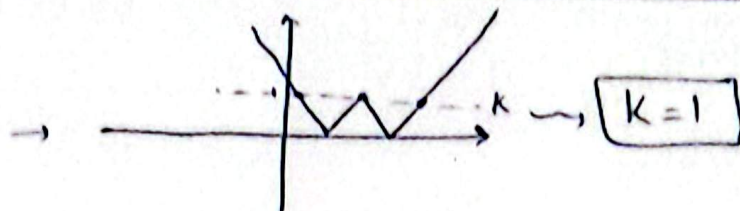
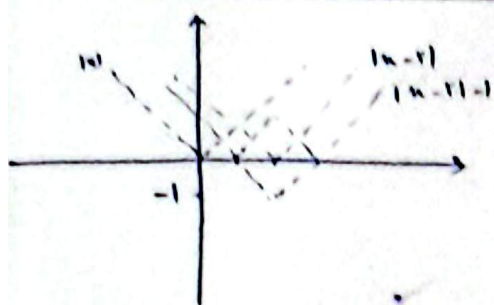
$$a) y = \sqrt{(u-1)(u-3)} = \sqrt{(u-1)([u]-1)}$$

$$\frac{1}{+} \mid \frac{1}{0} \mid \frac{1}{+} \quad D_f = \mathbb{R}$$

$$b) y = \sqrt{|u-1|(u-3)} = \sqrt{|u-1|([u]-1)}$$



$$D_f = [1, +\infty) \cup \{1\}$$



$$y = \frac{1}{||u-1|-1|-k} \rightarrow ||u-1|-1|-k \neq 0 \rightarrow ||u-1|-1| \neq k$$

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

$$u \neq \{-1, -1, 1\} \Rightarrow D_f = \mathbb{R} - \{-1, \pm 1\} \rightarrow n=1$$

$$u^2 - 4u + 9 = 0 \Rightarrow \Delta = 16 - 36 = -20 < 0 \Rightarrow \text{no real roots}$$

$$y = \log \log \frac{1}{u}$$

$$u > 0 \quad u \neq 1$$

$$\log \frac{1}{u} > 0 \Rightarrow u < 1 \rightarrow 1 < \frac{1}{u} < \infty \Rightarrow \text{domain is } (0, 1)$$

$$\Rightarrow D_f = (0, 1)$$

$$-1 \leq u^2 - 1 \leq 1 \Rightarrow -1 \leq u^2 \leq 1 \Rightarrow u^2 \leq 1 \Rightarrow u \leq \frac{1}{u} \Rightarrow -\sqrt{\frac{1}{u}} \leq u \leq \sqrt{\frac{1}{u}}$$

$$D_{f(u^2-1)} = \left[-\frac{\sqrt{1}}{1}, \frac{\sqrt{1}}{1} \right]$$