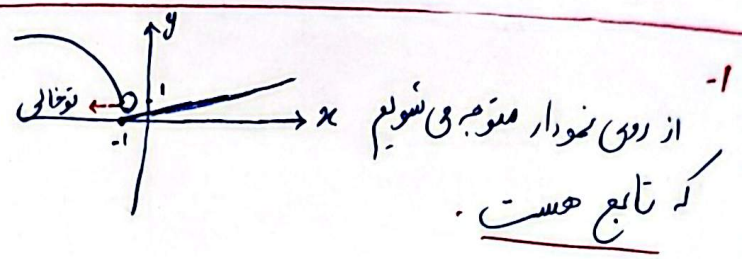


$$x = \begin{cases} 3y-1 & y \geq 0 \rightarrow y = \frac{1}{3}x + \frac{1}{3} \\ -y & y < 0 \rightarrow y = \pm \sqrt{-x} \end{cases}$$



۲- اگر به ریشه های $f(x)$ ، دو واحد اضافه کنیم ریشه های $f(x-2)$ بدست می آید

x	-۴	-۲	۰	۳	۵	۷
x	-	-	-	+	+	+
$f(x)$	-	+	+	+	-	+
$f(x-2)$	-	-	+	+	+	-
$g(x)$	-	+	-	+	-	+

$$D_g = [-4, -2] \cup [0, 3) \cup [7, +\infty)$$

$$f(x) = \frac{2x^2 - 3x + 2}{x^3 - 4x} = \frac{2x^2 - 3x + 2}{x(x-2)(x+2)} \rightarrow \begin{matrix} a > 0 \\ \Delta < 0 \end{matrix} \Rightarrow 2x^2 - 3x + 2 > 0$$

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

الف)

x	-۲	۰	۲
$f(x)$	-	+	-

ب) $\sqrt{f(x)} \rightarrow f(x) \geq 0$ $D_{\sqrt{f}} = (-2, 0) \cup (2, +\infty)$

الف) $y = \sqrt{\frac{x-2}{x^2-2x-1}} = \sqrt{\frac{x-2}{(x-2)(x+2)}} = \sqrt{\frac{1}{x+2}} \rightarrow \begin{matrix} x & -2 & 2 \\ y & - & + \end{matrix}$ $D_y = (-2, +\infty) - \{2\}$

ب) $y = \frac{2x^2+1}{x-2[-x]} \rightarrow x-2[-x] \neq 0 \Rightarrow [-x] \neq 2 \Rightarrow x \notin (-2, 2) \Rightarrow D_y = \mathbb{R} - (-2, 2)$

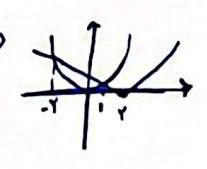
الف) $f(x) = \frac{\sqrt{x(x-1)}}{\sqrt{|x|+x}} \rightarrow \begin{matrix} x(x-1)/(x+1) \geq 0 \Rightarrow x \in [-1, 0] \cup [1, +\infty) \\ |x|+x \geq 0 \Rightarrow |x| > -x \Rightarrow x > 0 \end{matrix}$

x	-1	0	1
y	-	+	-

$D_f = [1, +\infty)$

ب) $f(x) = \frac{\sqrt{|x-2|-x^2}}{|x|-1} \rightarrow \begin{matrix} |x-2|-x^2 \geq 0 \Rightarrow |x-2| \geq x^2 \Rightarrow x \in [-2, 1] \\ |x|-1 \neq 0 \Rightarrow x \neq \pm 1 \end{matrix}$

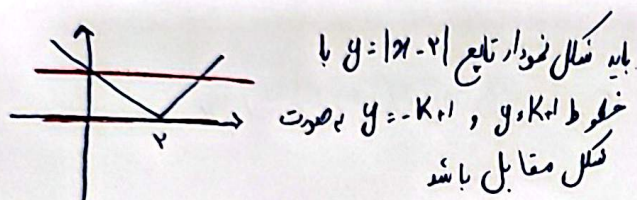
$D_f = [-2, -1) \cup (-1, 1)$



الف) $y = \sqrt{(x-2)(x-3)}$ $A \geq 0$: $\begin{array}{c|ccc} x & 2 & 3 & \\ \hline y & + & 0 & + \end{array} \Rightarrow D_y = \mathbb{R}$

ب) $y = \sqrt{|x-1|(x-3)}$ $A \geq 0$: $\begin{array}{c|ccc} x & 1 & 3 & 4 \\ \hline A & - & 0 & + \end{array} \Rightarrow D_y = \{1\} \cup [3, +\infty)$

$y = \frac{1}{||x-2|-1|-K}$ $\rightarrow ||x-2|-1|-K \neq 0 \Rightarrow \begin{cases} |x-2|-1 \neq K \Rightarrow |x-2| \neq K+1 \\ |x-2|-1 \neq -K \Rightarrow |x-2| \neq -K+1 \end{cases}$ -1



$\Rightarrow K+1=0 \Rightarrow K=-1 \Rightarrow K \geq 0$
 $-K+1=0 \Rightarrow K=1 \Rightarrow K+1=2 > 0$ قی

$x = \{0, 2, 4\}$, $K=1 \Rightarrow y = \frac{1}{0}$ تن

$f(x) = \frac{\frac{x^2-3x+2}{x^2+3x+2}}{\frac{x+1}{x-1}}$ $\begin{cases} x^2-3x+2 \neq 0 \Rightarrow (x-1)(x-2) \neq 0 \Rightarrow x \neq 1, 2 \\ \frac{x+1}{x-1} \neq 0 \Rightarrow x+1 \neq 0 \Rightarrow x \neq -1 \\ x-1 \neq 0 \Rightarrow x \neq 1 \end{cases} \Rightarrow x \neq -1, 1, 2$ -1
 $\Rightarrow n=3$

$x^2-2nx+3n = x^2-4x+9 \Rightarrow (x-3)^2 = 3 \Rightarrow x=3$ $\perp$ مضاعف

$y = \log_{x+1} \frac{1}{x^{\frac{1}{x}}}$ $\begin{cases} x > 0, x \neq 1 \\ \log_{x+1} \frac{1}{x^{\frac{1}{x}}} > 0 \Rightarrow \begin{cases} \frac{1}{x^{\frac{1}{x}}} > 1 \Rightarrow \frac{1}{x} < 1 \Rightarrow x < 1 \\ \frac{1}{x^{\frac{1}{x}}} < 1 \Rightarrow \frac{1}{x} > 1 \Rightarrow x > 1 \end{cases} \Rightarrow 0 < x < 1 \\ x+1 > 0, x+1 \neq 1 \Rightarrow x \neq -1 \\ \hookrightarrow x > -1 \end{cases} \Rightarrow D_f = (0, 1)$ -9

$D_f(x) = [-5, 2]$ $D_f(2x^2-1)$ $-5 \leq 2x^2-1 \leq 2 \Rightarrow -4 \leq 2x^2 \leq 3 \Rightarrow -\frac{2}{\sqrt{2}} \leq x^2 \leq \frac{3}{2}$ -1

$\begin{array}{c|ccc} x & \frac{1}{\sqrt{2}} & \frac{\sqrt{3}}{2} & \\ \hline A & + & - & + \end{array}$

$\Rightarrow x^2 \leq \frac{3}{2} \Rightarrow x^2 - \frac{3}{2} \leq 0 \Rightarrow (x - \frac{\sqrt{3}}{\sqrt{2}})(x + \frac{\sqrt{3}}{\sqrt{2}}) \leq 0$
 $\Rightarrow D_f(2x^2-1) = [-\frac{\sqrt{3}}{\sqrt{2}}, \frac{\sqrt{3}}{\sqrt{2}}]$