

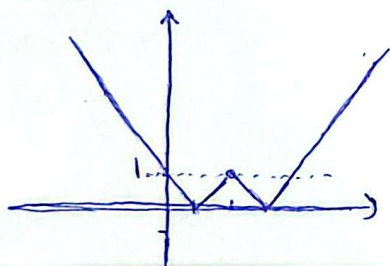
$f(x) = 1 \cdot x^2 + mx^2 - kx + nx + 2 + mn$ $\xrightarrow{\text{تعیین ضرایب}}$ $\begin{cases} 1+m=0 \Rightarrow m=-1 \\ n-k=0 \Rightarrow n=k \\ \Rightarrow p+1=-1 \Rightarrow p=-1 \end{cases}$
 $g(x) = \{(k, -1), (k, p+1), (p+1, -1), (-1, p+k)\}$
 $g(-1+2) = -1 \Rightarrow g(-1) = -1 \Rightarrow p+k = -1 \Rightarrow -1+k = -1 \Rightarrow k=0$
 $m+n+p+k = -1+0-1+0 = -2$

الف) $\frac{x-2}{x^2-2x-1} \geq 0 \Rightarrow \frac{x-2}{(x-4)(x+2)} \geq 0 \Rightarrow \frac{-}{-+} + \frac{+}{++} \Rightarrow D = (-2, +\infty) - \{2\}$

ب) $y = \frac{kx^2+1}{k-2[x]}$: $k-2[x] = 0 \Rightarrow [-x] = 2 \Rightarrow 1 < -x < 3 \Rightarrow -3 < x < -1$
 $D = \mathbb{R} - (-3, -1]$

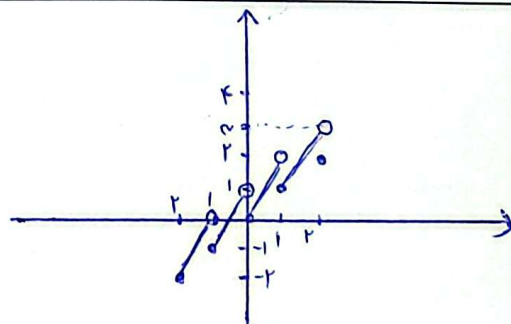
الف) ۱) $x(x^2-1) \geq 0 \Rightarrow \frac{-}{-+} + \frac{+}{++} \Rightarrow D = (-1, +\infty)$
 ۲) $|x|+x \geq 0 \Rightarrow \begin{cases} x \geq 0 \\ x < 0 \end{cases} \Rightarrow D = [0, +\infty)$
 ۳) $|x|+x \neq 0 \Rightarrow x > 0 \Rightarrow D = (0, +\infty)$
 ب) ۱) $|x-2| - x^2 \geq 0 \Rightarrow |x-2| \geq x^2$
 ۲) $|x|-1 \neq 0 \Rightarrow x \neq \pm 1 \Rightarrow D = [-2, 1) - \{-1\}$

~~$|x-2|-1 \geq k$~~ $|x-2|-1 \geq k \Rightarrow ||x-2|-1| \geq k$ یعنی مجموع ۳ ریشه دارد



برای اینکه خط $y=k$ غزدار دارد ۳ ریشه صحیح
 $k=1$ باید ۱ باشد

$-2 < x < -1 \Rightarrow [x] = -2 \Rightarrow y = kx+2$
 $-1 < x < 0 \Rightarrow [x] = -1 \Rightarrow y = kx+1$
 $0 < x < 1 \Rightarrow [x] = 0 \Rightarrow y = kx$
 $1 < x < 2 \Rightarrow [x] = 1 \Rightarrow y = kx-1$
 $x=2 \Rightarrow [x] = 2 \Rightarrow y = kx-2 = 2$



$$f(x) = \frac{(x-1)(x-1)}{x+a} + b \quad \begin{cases} a = -1 \Rightarrow \frac{(x-1)(x-1)}{(x-1)} + b = x-1+b \Rightarrow b=1 \Rightarrow a-b = -1 \\ a = -1 \Rightarrow \frac{(x-1)(x-1)}{x-1} + b = x-1+b \Rightarrow b=1 \Rightarrow a-b = -1 \end{cases}$$

$$a-b = -1$$

$$\frac{x^2+1x^2-x-1}{x^2-1}, \frac{x(x^2-1)+1(x^2-1)}{(x^2-1)} = (x+1) \Rightarrow f(x) = \begin{cases} x+1 & x \neq \pm 1 \\ \frac{ax+1}{x+b} & x = \pm 1 \end{cases}$$

$$g(1) = f(1) \Rightarrow 1+1 = \frac{a+1}{b+1} \Rightarrow 1b-a = -1$$

$$g(-1) = f(-1) \Rightarrow -1+1 = \frac{-a+1}{b-1} \Rightarrow a+b = 1$$

$$\Rightarrow \begin{cases} b = \frac{1}{2} \\ a = \frac{1}{2} \end{cases} \quad b+c = 0 \Rightarrow 1 + \frac{1}{2} = \frac{3}{2}$$

$$f(x) = \frac{x}{x+1} \Rightarrow x \geq \frac{x}{x+1} \quad b = \frac{x}{x+1} \Rightarrow x \leq \frac{b}{b+1} \quad D_f \cap D_g = \{1\} \Rightarrow$$

$$\Rightarrow \frac{x}{x+1} \geq \frac{b}{b+1} \Rightarrow b = 1, a = \frac{1}{2} \Rightarrow g(x) = \sqrt{\frac{b-x}{b}} + 1, f(x) = \sqrt{\frac{x-1}{x}} + 1$$

$$(f-g)(1) = 1 \Rightarrow 1(\sqrt{\frac{1-1}{1}} + 1) - (\sqrt{\frac{1-1}{1}} + 1) = 1$$

$$\Rightarrow 1-1-1 = -1 \Rightarrow 1 = -1 \Rightarrow 1 = -1 \Rightarrow 1 = -1$$

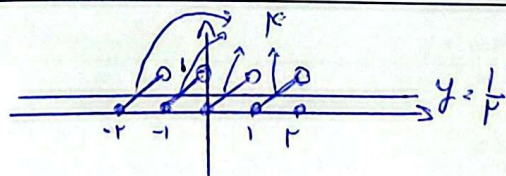
$$f(x) = \frac{x}{x+1} \Rightarrow x \geq -1 = D_g \quad m = x \Rightarrow x \leq m = D_f \Rightarrow -1 \leq x \leq m$$

$$D_f \cap D_g = [-1, m] \Rightarrow m = 1 \Rightarrow f(x) = \sqrt{1-x} + 1$$

$$(f-g)(1) = \sqrt{1-1} + 1 - \sqrt{1-1} = 1 \Rightarrow 1 = 1 \Rightarrow 1 = 1$$

$$m+n = \sqrt{1-1} + 1 + 1 = 2$$

$$y = x - [x] = \frac{1}{x}$$



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