

$$f(x) = x^2 + 2x + 1 + 9x^2 + 1 - 4x + mx^2 + nx + mn = (1+m)x^2 - (4-n)x + 1+mn$$

$m = -10$  و  $n = 4 \Rightarrow f(x) = -9x^2$

$$g(x) = f(4, -10), f(4, p+1), f(p+2, -1), f(-9, p+12)$$

$p = -19 \rightarrow -10$        $-9 \rightarrow -9$        $-1 \rightarrow 12$        $12 \rightarrow 10$

$-10 + 4 - 9 + 10 = -5$

الف)  $\sqrt{\frac{x-2}{(x^2-4)(x^2+2)}} \rightarrow \frac{-2}{-\frac{1}{2} + \frac{1}{2}} \Rightarrow D_f = (-2, 2) \cup (2, +\infty)$

ب)  $4-2[-x] \neq 0 \rightarrow 2 \neq [-x] \rightarrow x \in \mathbb{R} - [-2, 2]$

الف)  $x(x-1)(x+1) > 0 \rightarrow \frac{-1 \quad 0 \quad 1}{-\infty \quad -1 \quad 0 \quad 1 \quad \infty} \left\{ |x| + x \neq 0 \rightarrow x \in (-\infty + \infty) \right\}$

$x \in [1, +\infty)$

ب)  $|x| \neq 1 \rightarrow x \neq -1$  و  $1$

$|x-2| - x^2 > 0 \rightarrow \frac{2}{2-x-x^2} \left\{ \begin{array}{l} x-2-x^2 \\ -x^2-2x+2 \end{array} \right. \rightarrow x = -2$

$\frac{-2 \quad 1}{-\infty \quad -1 \quad 0 \quad 1 \quad \infty} \leftarrow -(x+2)(x-1)$        $\rightarrow$  مشتق

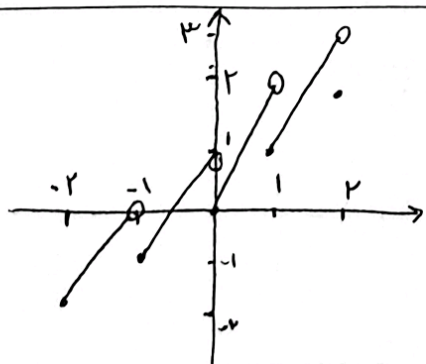
$||x-2|-1| \neq k$

$\downarrow$

$\frac{1-x}{1-x} |x-2| \rightarrow R_f = [-1, +\infty)$

$\left\{ \begin{array}{l} |x-2| - 1 \\ -1 \quad 1 \end{array} \right. \rightarrow k = 1$

$\frac{-1 \quad 1}{-\infty \quad -1 \quad 0 \quad 1 \quad \infty} \leftarrow \frac{1-x}{1-x} |x-2|$



$[-2, -1) \rightarrow 2x + 2$

$[-1, 0) \rightarrow 2x + 1$

$[0, 1) \rightarrow 2x$

$[1, 2) \rightarrow 2x + 1$

$$f(x) = x \rightarrow \frac{(x-3)(x-1)}{x+a} + b \xrightarrow{a=-1} x-3+b=x \rightarrow b=3$$

$$\left\{ \begin{array}{l} a=-3 \\ x-1+b=x \rightarrow b=1 \\ -1+3=-K \\ -3-1=-K \end{array} \right\} a-b = \boxed{-K}$$

۶

$$f(x) = \begin{cases} \frac{(x-1)(x+1)(x+2)}{(x-1)(x+1)} = x+2 \rightarrow x+2 = x+c \Rightarrow c=2 \\ \frac{ax+2}{x+b} \xrightarrow{\text{مخرجی}} \frac{2x+2}{2+b} = x \rightarrow \frac{2x+2}{2+b} = x \rightarrow 2x+2 = x(2+b) \rightarrow a=2 \\ \frac{2}{b} = 2 \rightarrow b=1 \end{cases}$$

$$b+c = 1+2 = \boxed{3}$$

۷

از زوج مرتب  $\{(a, b)\}$  متوجه می‌شویم که  $f$  و  $g$  تنها یک عضو مشترک دارند لذا:

$$f(x) = \sqrt{4x-4} + 1 - K \text{ و } g(x) = \sqrt{4-4x} + 3K \Rightarrow 3a = K \text{ و } b = 4$$

$$2f - g \rightarrow 2K - 2 - 3K = -K - 2 = K \rightarrow \boxed{K = -1}$$

$$3a - \frac{b}{2} - K = K - \frac{4}{2} + 1 = \boxed{3}$$

۸

$$D_g = [-1, +\infty) \rightarrow D_g \cap D_f = [-1, 7] \Rightarrow m = 7$$

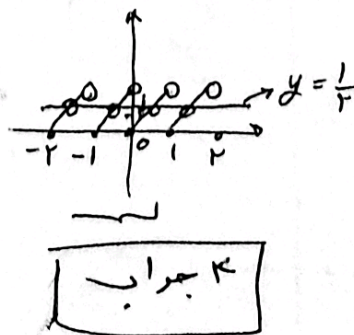
$$\hookrightarrow g(x) = \sqrt{2x+2} \text{ و } f(x) = \sqrt{7-x} + n$$

$$\sqrt{7-x} + n - \sqrt{2x+2} \xrightarrow{x=4} 4+n-2\sqrt{2} = 4\sqrt{2} \rightarrow 4+n = 6\sqrt{2} \rightarrow n = 6\sqrt{2}-4$$

$$\hookrightarrow m+n = 7-2+6\sqrt{2} = \boxed{5+6\sqrt{2}}$$

۹

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



۱۰