

$$f(x) = (x+1)^2 + (x^2-1)^2 + m(x^2-1) + n(x+1) \rightarrow x=0 \rightarrow (1)^2 + (-1)^2 + 0 + 0 + mn \rightarrow 1+1+mn = 14 \rightarrow m+n=12$$
  

$$\rightarrow x=-1 \rightarrow (0)^2 + (-1)^2 + m(-1) + n(0) \rightarrow 0+1-m+n = -9 \rightarrow -m+n = -10$$
  

$$\rightarrow x=1 \rightarrow (2)^2 + (0)^2 + m(0) + n(2) \rightarrow 4+0+0+2n = 14 \rightarrow 2n = 10 \rightarrow n = 5$$
  

$$m = -10$$
  

$$g(x) = \{(x, m), (n, p+1), (p+2, -1), (-9, p+K)\} = \{(x, -10), (5, p+1), (p+2, -1), (-9, p+K)\}$$
  

$$p+1 = -10 \rightarrow p = -11$$
  

$$p+K = -1 \rightarrow K = 10$$
  

$$\Rightarrow m+n+p+K = (-10) + (5) + (-11) + (10) = -6$$

$$y = \sqrt{\frac{x-2}{x^2-x-6}} = \sqrt{\frac{x-2}{(x-3)(x+2)}} = \sqrt{\frac{x-2}{(x-2)(x+2)(x^2+2)}} \xrightarrow{\text{عبارت ساده شود}} \frac{1}{\sqrt{(x+2)(x^2+2)}} \neq 0, (x-2)(x+2)(x^2+2) \neq 0$$
  

$$\rightarrow \frac{-2}{-4+4} \rightarrow D_f = (-2, +\infty) - \{2\}$$
  

$$b) f(x) = \frac{x^2+1}{x-2[-x]} \rightarrow x-2[-x] \neq 0 \rightarrow x[-x] \neq 2 \rightarrow [-x] \neq \frac{2}{x} \rightarrow x \neq (-2, -2)$$
  

$$\rightarrow D_f = (-\infty, -2] \cup (-2, +\infty)$$

$$الف) f(x) = \frac{\sqrt{x(x^2-1)}}{\sqrt{x+1}}$$
  

$$\rightarrow x(x^2-1) \geq 0 \rightarrow x(x-1)(x+1) \geq 0 \rightarrow \begin{matrix} \text{---} & \text{---} & \text{---} \\ \text{---} & \text{---} & \text{---} \end{matrix} \rightarrow [-1, 0] \cup [1, +\infty)$$
  

$$\rightarrow |x|+x \geq 0 \rightarrow |x| \geq -x \rightarrow x \in (0, +\infty)$$
  

$$\rightarrow A \cap B: \begin{matrix} \text{---} & \text{---} & \text{---} \\ \text{---} & \text{---} & \text{---} \end{matrix} \Rightarrow D_f = [1, +\infty)$$
  

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

$$\rightarrow |x-2|-x^2 \geq 0 \rightarrow -x^2+x-2 \geq 0 \rightarrow x^2-x-2 \leq 0 \rightarrow (x+2)(x-1) \leq 0 \rightarrow \begin{matrix} \text{---} & \text{---} & \text{---} \\ \text{---} & \text{---} & \text{---} \end{matrix} \rightarrow [-2, 1]$$
  

$$\rightarrow |x|-1 \neq 0 \rightarrow |x| \neq 1 \rightarrow \begin{matrix} \text{---} & \text{---} & \text{---} \\ \text{---} & \text{---} & \text{---} \end{matrix} \rightarrow A \cap B: D_f = [-2, -1) \cup (-1, 1]$$

$$y = \frac{1}{||x-2|-1|-K}$$
  

$$\rightarrow ||x-2|-1|-K \neq 0 \rightarrow ||x-2|-1| \neq K \rightarrow |x-2|-1 \neq K \rightarrow |x-2| \neq K+1$$
  

$$\rightarrow |x-2| \neq K+1 \rightarrow \begin{cases} x-2 \neq K+1 \rightarrow x \neq K+3 \\ 2-x \neq K+1 \rightarrow x \neq 1-K \end{cases}$$
  

$$\rightarrow |x-2| \neq 1-K \rightarrow \begin{cases} x-2 \neq 1-K \rightarrow x \neq 3-K \\ 2-x \neq 1-K \rightarrow x \neq K+1 \end{cases}$$
  

$$\rightarrow \begin{cases} x-K = K+1 \rightarrow x = 2K+1 \\ x-K = 1-K \rightarrow x = 1 \end{cases}$$
  

$$i) K=1 \rightarrow \begin{cases} x \neq 3 \\ x \neq 0 \\ x \neq 2 \end{cases} \Rightarrow K=1$$

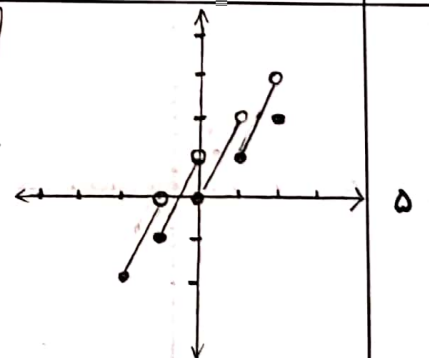
$$x \in [-2, -1) \rightarrow [x] = -2 \rightarrow y = x[x] = -2x$$
  

$$x \in [-1, 0) \rightarrow [x] = -1 \rightarrow y = x[x] = -x$$
  

$$x \in [0, 1) \rightarrow [x] = 0 \rightarrow y = x[x] = 0$$
  

$$x \in [1, 2) \rightarrow [x] = 1 \rightarrow y = x[x] = x$$
  

$$x = 2 \rightarrow [x] = 2 \rightarrow y = x[x] = 4$$



$$f(x) = \frac{x^y - fxy + y^y}{x + a} + b \xrightarrow{\text{condition}} f(1) = 1 \rightarrow \frac{1 - f + y^y}{1 + a} + b = 1 \rightarrow (b = 1) \rightarrow f(x) = \frac{x^y - fxy + y^y}{x + a} + 1$$

$$f(y) = y \rightarrow \frac{y - fxy + y^y}{y + a} + b = y \rightarrow (b = y) \rightarrow f(x) = \frac{x^y - fxy + y^y}{x + a} + y$$

$$\text{condition} \rightarrow f(y) = y \xrightarrow{(b=y)} \frac{y^y - fxy + y^y}{y + a} + y = y \rightarrow \frac{(f) - (1) + y^y}{y + a} + y = y \rightarrow \frac{-1}{y + a} = -1 \rightarrow (a = -1)$$

$$\xrightarrow{(b=1)} \frac{y^y - fxy + y^y}{y + a} + 1 = y \rightarrow \frac{(f) - (1) + y^y}{y + a} + 1 = y \rightarrow \frac{-1}{y + a} = 1 \rightarrow (a = -y)$$

$$\text{if } b = y \rightarrow a = -1 \rightarrow a - b = -1 - y = (-f) / \text{if } b = 1 \rightarrow a = -y \rightarrow a - b = -y - 1 = (-f) \rightarrow \boxed{a - b = \{-f\}}$$

6

$$\text{if } x \neq \pm 1, x = y \rightarrow f(x) = \frac{y^y + yx^y - y - y^y}{yx - 1} \xrightarrow{x=y} f(y) = \frac{1 + 1 - y - y^y}{y^y} = (-f) \left\{ \begin{array}{l} g(y) = f(y) \\ y + C = f \\ \rightarrow C = y \end{array} \right.$$

$$g(x) = x + C \xrightarrow{x=y} g(y) = y + C$$

$$\rightarrow g(x) = x + y$$

$$\text{if } x = 1 \rightarrow f(x) = \frac{ay + y^y}{x + b} \xrightarrow{x=1} f(1) = \frac{a + y^y}{b + 1} \rightarrow f(1) = g(1) = \frac{a + y^y}{b + 1} \xrightarrow{1+y=1} \frac{a + y^y}{b + 1} = y \rightarrow yb + y^y = a + y^y$$

$$\text{if } a = -1 \rightarrow f(x) = \frac{ay + y^y}{x + b} \xrightarrow{x=-1} f(-1) = \frac{-a + y^y}{-1 + b} \rightarrow f(-1) = g(-1) = \frac{-a + y^y}{-1 + b} = 1 \rightarrow \frac{b - 1}{fb + y} = f \rightarrow fb = y, \boxed{b = \frac{y}{f}}$$

$$\rightarrow b + C = \frac{y}{f} + y = \boxed{y/f}$$

7

$$y \neq -g \{(1, K)\} \rightarrow g(1) = K \rightarrow g(x) = \sqrt{b - f} + y^K \Rightarrow g(1) = \sqrt{b - f} + y^K = K$$

$$\rightarrow f(\frac{1}{y}) = K \rightarrow f(x) = \sqrt{fxy - ya} + K - 1 \Rightarrow f(\frac{1}{y}) = \sqrt{y - ya} + K - 1 = K$$

$$\rightarrow \sqrt{b - f} + y^K = K \rightarrow \sqrt{b - f} = -y^K \rightarrow b - f = fK^y \rightarrow b = fK^y + f \rightarrow \boxed{\frac{b}{y} = yK^y + y}$$

$$\rightarrow \sqrt{y - ya} = 1 \rightarrow y - ya = 1 \rightarrow ya = 1 \rightarrow \boxed{a = \frac{1}{y}}$$

$$\rightarrow ya = \frac{b}{y} - K = y(\frac{1}{y}) - yK^y - y - K = \boxed{yK^y - K - 1}$$

8

9

10