

$$f(x) = (x+1)^2 + (10x-1)^2 + mx^2 + nx + mn$$

$$f(x) = x^2 + 2x + 1 + 9x^2 - 20x + 1 + mx^2 + nx + mn = (10+m)x^2 + (n-18)x + 2 + mn$$

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

$$= \{(x, -10), (x, p+1), (p+2, -1), (9, p+k)\}$$

$$p+1 = -10 \Rightarrow p = -11 \quad p+k = -1 \Rightarrow k = 10$$

$$m = -10 \quad n = x$$

$$m+n+p+k = -10+x-11+10 = -x$$

$$الف) g = \sqrt{\frac{x-2}{x^2-2x-1}} \quad -2 + 2^* + D_f = (-2, 2) \cup (2, +\infty)$$

$$ب) f(x) = \frac{2x^2+1}{x-2[-x]}$$

$$x-2[-x] \neq 0$$

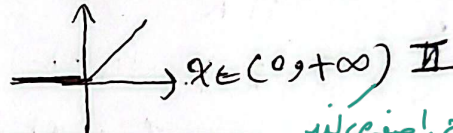
$$x \neq -2[-x] \Rightarrow x \neq -2x \Rightarrow x \neq 0$$

$$-2 < -x < 2 \Rightarrow -2 > x > 2$$

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

$$الف) f(x) = \frac{\sqrt{x(x^2-1)}}{\sqrt{|x|+x}} \quad x(x^2-1) \geq 0 \quad -1 + 0 -1 + x \in [-1, 0] \cup [1, +\infty) \quad I$$

$$D_f = I \cap II = [1, +\infty)$$



$$x = -1 \text{ مخرج صفر می شود}$$

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

$$|x| \neq 1 \Rightarrow x \neq \pm 1 \quad I$$

$$x \geq 2 \quad -x^2+x-2 \leq 0$$

$$x < 2 \quad -x^2-x+2 \leq 0 \Rightarrow x \in [-2, 1] \quad II$$

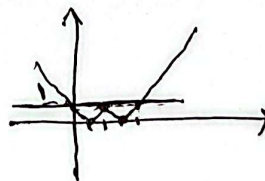
$$D_f = [-2, 1] - \{-1, 1\}$$

$$y = \frac{1}{|1x-2|-11-k}$$

$$|1x-2|-11=k$$

$$k=1$$

x	0	1	2	3	4
y	1	0	1	0	1



$$y = 2x - [x]$$

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

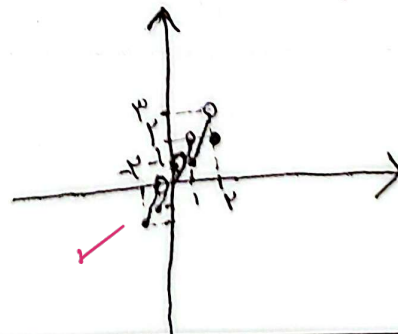
$$-2 \leq x < -1$$

$$-1 \leq x < 0$$

$$0 \leq x < 1$$

$$1 \leq x < 2$$

$$x=2$$



$$f(x) = \frac{x^2 - \varepsilon x + 10}{x+a} + b$$

$$\frac{(x-1)(x-10)}{x+a} + b$$

$$1) a = -1$$

$$2) a = -10$$

$$x-10+b \Rightarrow b=10$$

$$x-1+b \Rightarrow b=1$$

$$a-b = \{-\varepsilon\}$$

$$f(x) = \begin{cases} \frac{x^2 + 10x^2 - x - 1}{x^2 - 1} ; x \neq \pm 1 \\ \frac{11x+1}{x+b} ; x = \pm 1 \end{cases}$$

$$\frac{x^2 + 10x^2 - x - 1}{x^2 - 1} = \frac{11x^2 - x - 1}{x^2 - 1}$$

$$\frac{(11x+1)(x+1)}{x^2 - 1} = \frac{(11x+1)(x+1)}{(x-1)(x+1)} = \frac{11x+1}{x-1}$$

$$g(x) = x + c \quad b+c = \frac{1}{1} + \frac{10}{-1} = -9$$

$$b+a = 10 \Rightarrow a = -9, b = 1$$

$$g(1) = 10, g(-1) = 1, \frac{1+10}{1+b} = 10, \frac{1-9}{b-1} = 1$$

$$f(x) = \sqrt{\varepsilon x - 10a} + k - 1$$

$$g(x) = \sqrt{b - \varepsilon x} + 10k$$

$$a = \frac{\varepsilon}{10} \Rightarrow f(x) = \sqrt{\varepsilon x - \varepsilon} + k - 1 \Rightarrow f(1) = k - 1$$

$$b = \varepsilon \Rightarrow g(x) = \sqrt{\varepsilon - \varepsilon x} + 10k \Rightarrow g(1) = 10k$$

$$10\left(\frac{\varepsilon}{10}\right) - \frac{\varepsilon}{10} + 1 = \varepsilon - 1 + 1 = \varepsilon$$

$$D_{f+g} = D_f \cap D_g = \{1\}$$

$$\varepsilon x - 10a \geq 0 \Rightarrow \varepsilon x \geq 10a \Rightarrow x \geq \frac{10a}{\varepsilon} = 1 \quad a = \frac{\varepsilon}{10}$$

$$b - \varepsilon x \geq 0 \Rightarrow b \geq \varepsilon x \Rightarrow \frac{b}{\varepsilon} \geq x$$

$$10k - 10k = k, b = \varepsilon, -10k = k, k = -1$$

$$f(x) = \sqrt{m-x} + n$$

$$g(x) = \sqrt{10x+10}$$

$$D_{f+g} = D_f \cap D_g$$

$$m-x \geq 0 \Rightarrow m \geq x \Rightarrow m=1$$

$$f(1) = g(1) = (\sqrt{1-1} + n)(\sqrt{10 \cdot 1 + 10}) = (n)(\sqrt{20}) = 10\sqrt{2}$$

$$m+n = 1+1 = 2$$

$$1+n = 10\sqrt{2} \Rightarrow n = 10\sqrt{2} - 1, m+n = 1 + 10\sqrt{2}$$

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

جواب

