

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

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

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

$m = -10 \quad n = 2$

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

$m+n+p+k = -10+2-1+k = -9+k = -7 \Rightarrow k=2$

$p+1 = -10 \Rightarrow p = -11 \quad p+k = -1 \Rightarrow k=2$

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

(x^2-2x-1)

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

$2-x[-x] = 2+x^2 > 0$

$D_f = \mathbb{R} - (-2, 2]$

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

$|x|+x > 0$

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

$x \in (0, +\infty) \quad II$

ج) $f(x) = \frac{\sqrt{|x+1|-x^2}}{|x|-1}$ $|x| \neq 1 \Rightarrow x \neq \pm 1 \quad I$ $D_f = [-2, 1)$

$x > 1 \quad -x^2+x-2 < 0$

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

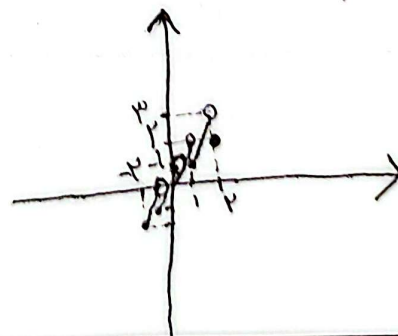
$y = \frac{1}{|1x-2|-1-k}$ $|1x-2|-1=k$

$k=1$

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

$y = 2x - [x]$

$y = \begin{cases} 2x+2 & -2 \leq x < -1 \\ 2x+1 & -1 \leq x < 0 \\ 2x & 0 \leq x < 1 \\ 2x-1 & 1 \leq x < 2 \\ 2 & x=2 \end{cases}$



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

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

$$\begin{aligned} 1) a = -1 & \quad x-p+b \Rightarrow b=p \\ 2) a = -p & \quad x-1+b \Rightarrow b=1 \end{aligned}$$

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

$$f(x) = \begin{cases} \frac{x^p + px^p - x - \varepsilon}{x^p - 1} ; x \neq \pm 1 \\ \frac{ax+p}{x+b} ; x = \pm 1 \end{cases}$$

$$g(x) = x + c \quad b+c = \frac{1}{p} + p = \frac{a}{p}$$

$$\begin{aligned} b+a = p & \Rightarrow a = p-b \\ -pb+a &= 1 \end{aligned}$$

$$\frac{x^p + px^p - x - \varepsilon}{x^p - 1} \cdot \frac{x^p - 1}{x^p - 1} = \frac{x^p + px^p - x - \varepsilon}{x^p - 1}$$

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

$$\begin{aligned} g(1) &= p \\ g(-1) &= 1 \\ \frac{a+p}{1+b} &= p \\ \frac{p-a}{b-1} &= 1 \end{aligned}$$

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

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

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

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

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

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

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

$$\begin{aligned} pk - p - pk &= k \\ -k - p &= k \\ k &= -1 \end{aligned}$$

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

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

$$g(x) = \sqrt{px + p}$$

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

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

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

$$m + n = v + 1 = 1$$

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

جواب

