

$f(n) =$ تابع ثابت $\Rightarrow 0 = 2 \cdot 0 = 2 \cdot 0 = 0 \Rightarrow f(n) = -10 + 2 = -8$

$(n+1)^2 + (m+1)^2 = n^2 + 1 + m^2 + 1 - 2n = 10n^2 - 2m + 2 + m^2 + 2n + 1$

$g(n) = \{(49-10)(49+1)9(P+29-1)9(-99+K)\}$ تابع است. $P+1=0 \Rightarrow P=-1$

$m+n+P+K = 10-10-1+0 = -1 \Rightarrow K=0$

الف) $y = \sqrt{\frac{x-2}{x^2-2x^2-1}} \Rightarrow \frac{x-2}{x^2-2x^2-1} > 0$

$\Rightarrow x^2-2x^2-1 \neq 0 \Rightarrow x^2-2x^2-1 \neq 0 \Rightarrow (x-2)(x+2) = x^2-4$

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

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$x^2-2x^2-1 = (x^2-2)(x^2+1) - (2x^2-2)(x^2+1)$

الف) $f(n) = \sqrt{\frac{n(n^2-1)}{n^2+1}} \Rightarrow n(n^2-1) > 0 \Rightarrow \frac{-1}{-1} + \frac{0}{0} - \frac{1}{-1} + \frac{1}{1} \Rightarrow [-1, 0] \cup [1, +\infty)$

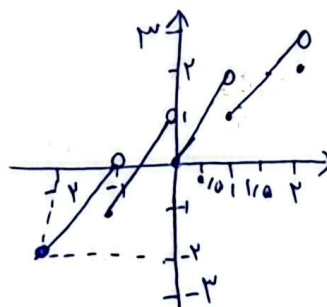
ب) $f(n) = \sqrt{\frac{n(n^2-1)}{n^2+1}} \Rightarrow |n-1| > 0 \Rightarrow |n-1| > 0 \Rightarrow n \neq 1 \Rightarrow D_{f(n)} = [-2, 1) \cup (1, 2]$

$y = \frac{1}{|n-1|} \Rightarrow D_y = R - \{1\} \Rightarrow ||n-1|-1| - K \neq 0 \Rightarrow ||n-1|-1| \neq K$

$\begin{cases} |n-1|=K \rightarrow |n-1|=K+1 \rightarrow n=2 \pm (K+1) \\ |-(n-1)-1|=K \rightarrow |-(n-1)-1|=K \rightarrow n=2 \pm (1-K) \end{cases} \Rightarrow K=1 \Rightarrow n=2$

$y = 2n - [n] \quad D_y = [-2, 2]$

$n-2$	-1	0	1	2	0/0
y	-2	-1	0	1	2



$$f(n) = \frac{n^2 - 4n + 3}{n + a} + b \rightarrow \text{تابع کسری} \rightarrow \begin{matrix} \text{مخرج} \\ \text{صفر} \end{matrix} \rightarrow \begin{matrix} \text{مخرج} \\ \text{صفر} \end{matrix} = 0 \\ \text{مخرج} \neq 0$$

می‌توانیم که هر دو طرف را به هم مساوی کنیم و جواب را پیدا کنیم.

$$\begin{cases} n=1 \Rightarrow 1 = \frac{1-4+3}{1+a} + b \Rightarrow 1 = \frac{0}{1+a} + b \Rightarrow \boxed{b=1} \\ n=2 \Rightarrow \frac{4-8+3}{2+a} + 1 = 2 \Rightarrow \frac{-1}{2+a} = 1 \Rightarrow -1 = 2+a \Rightarrow a = -3 \Rightarrow a-b = -3-1 = -4 \end{cases}$$

عدد فرضی را در نظر می‌گیریم.

$$f(n) = \begin{cases} \frac{x^2 + 2n^2 - 4x}{n^2 - 1} ; n \neq \pm 1 \\ \frac{a + 2}{n + b} ; n = \pm 1 \end{cases}$$

$g(n) = n + c \rightarrow g(n) = f(n)$

$n=0 \rightarrow \begin{cases} g(0) = 0 + c \\ f(0) = \frac{0+0-0}{0-1} = \frac{-0}{-1} = 0 \end{cases} \Rightarrow \boxed{c=0}$

$n=1 \rightarrow \begin{cases} g(1) = 1 + c \\ f(1) = \frac{a+2}{1+b} \end{cases} \Rightarrow \frac{a+2}{1+b} = 1 \Rightarrow a+2 = 1+b \Rightarrow a-b = b-1$

$n=-1 \rightarrow \begin{cases} g(-1) = -1 + c \\ f(-1) = \frac{-a+2}{-1+b} \end{cases} \Rightarrow \frac{-a+2}{-1+b} = -1 \Rightarrow -a+2 = -1+b \Rightarrow -a-b = b-3 \Rightarrow a+b = 3$

$\frac{a+2}{1+b} = 1 \Rightarrow a+2 = 1+b \Rightarrow a-b = b-1$

$\frac{-a+2}{-1+b} = -1 \Rightarrow -a+2 = -1+b \Rightarrow -a-b = b-3 \Rightarrow a+b = 3$

$$f(n) = \sqrt{4n - 3a} + k - 1 \rightarrow 4n - 3a > 0 \rightarrow 4n > 3a \rightarrow n > \frac{3a}{4}$$

$$g(n) = \sqrt{b - 4n} + 3k \rightarrow 4n < b \rightarrow n < \frac{b}{4}$$

$f = g \Rightarrow \left(\frac{3a}{4} < n < \frac{b}{4} \right) \Rightarrow \frac{3a}{4} < \frac{b}{4} \Rightarrow 3a < b \Rightarrow \frac{b}{a} > 3$

$\frac{b}{a} = 1 \Rightarrow b = a$

$\frac{3a}{4} = 1 \Rightarrow a = \frac{4}{3}$

$3a - \frac{b}{4} - k = ? \Rightarrow 3 \times \frac{4}{3} - \frac{4}{4} - (-1) = 4 - 1 + 1 = 4$

$4k - 3k = k \Rightarrow k = 1$

$$f(n) = \sqrt{m-n} + n \rightarrow m-n > 0 \rightarrow n < m \Rightarrow n < 7 \Rightarrow \boxed{m=7}$$

$$g(n) = \sqrt{2n+2} \rightarrow 2n+2 > 0 \rightarrow n > -1 \Rightarrow D_g = [-1, +\infty)$$

$D_{f \cap g} = [-1, 7]$

$f - g = 4\sqrt{2} \rightarrow \sqrt{7-n} + n - \sqrt{2n+2} = 4\sqrt{2} \rightarrow 7-n - 2n - 2 = 16\sqrt{2} \rightarrow 5-3n = 16\sqrt{2}$

$m+n = ? \rightarrow 7 + 16\sqrt{2} = 17 + 16\sqrt{2} \Rightarrow \boxed{m+n = 17 + 16\sqrt{2}}$

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

$D_y = [-\frac{1}{2}, 2]$

$y = \frac{1}{x}$

$x=1 \rightarrow y=1$

$x=2 \rightarrow y=\frac{1}{2}$

$x=3 \rightarrow y=\frac{1}{3}$

$x=4 \rightarrow y=\frac{1}{4}$

$x=5 \rightarrow y=\frac{1}{5}$

$x=6 \rightarrow y=\frac{1}{6}$

$x=7 \rightarrow y=\frac{1}{7}$

$x=8 \rightarrow y=\frac{1}{8}$

$x=9 \rightarrow y=\frac{1}{9}$

$x=10 \rightarrow y=\frac{1}{10}$

$x=11 \rightarrow y=\frac{1}{11}$

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