

الف) $f(x) = \sqrt{\frac{x+1}{x} - \frac{x}{x+1}} \Rightarrow \sqrt{\frac{x^2 - 2x + 1 - x^2}{x^2 - x}} = \sqrt{\frac{-2x+1}{x(x+1)}} \Rightarrow x \neq 0, 1$

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

مشتق: $\frac{1}{x^2} - \frac{1}{x^2} = 0$

دامنه: $D_f = (-\infty, 0) \cup (\frac{1}{2}, 1) \cup (1, +\infty)$

الف) $f(x) = \sqrt{(\frac{1}{x} - 9)(2x - x^2)} = \sqrt{(\frac{1}{x} - 9)(x(2-x))}$

ب) $\sqrt{x-1} + \sqrt{y+1} = 3 \Rightarrow \sqrt{y+1} = 3 - \sqrt{x-1} \Rightarrow y+1 = 9 - 6\sqrt{x-1} + x-1 \Rightarrow y = x - 6\sqrt{x-1} + 9$

دامنه: $D_f = (-\infty, -1] \cup [\frac{9}{4}, +\infty)$

$f(x) = \frac{\log(x^2 - x - 2)}{\sqrt{x^2 - 1} + 1} \Rightarrow x^2 - x - 2 > 0 \Rightarrow (x-2)(x+1) > 0$

دامنه: $D_f = (-\infty, -1) \cup (2, +\infty)$

$f(x) = \sqrt{2+qx-x^2}$ شکل سهمی رو برپایین ات تقریب بده $\Rightarrow -x^2 + qx + 2: \Delta > 0$

دامنه: $D_f = [-2, b]$ و در اینجا $b = -\frac{q}{2}$

ب) $2b = -3 \Rightarrow b = -\frac{3}{2}$

دامنه: $D_f = [-2, -\frac{3}{2}]$

$x^2 + ax - x^2 \neq 0 \Rightarrow x^2 - ax - 2 = 0 \Rightarrow (x-a)(x-b) = 0 \Rightarrow a = x-b$

دامنه: $D_f = [a, b]$ و در اینجا $a = -2$

ب) $a+b = -2$

$D_f = (-\infty, -1) \cup (1, +\infty) \cap [(-\infty, -1) \cup (1, +\infty)] = (-\infty, -1) \cup (1, +\infty)$

① ب)

$$\begin{aligned} x^2 + x \neq 0 &\Rightarrow x(x+1) \neq 0 \Rightarrow \begin{cases} x_1 = 0 \\ x_2 = -1 \end{cases} \\ x^2 + 2 \neq 0 &\Rightarrow \{x = -\omega \Rightarrow x = -\frac{\omega}{\epsilon} \geq -1, 2\} \\ x^2 + x - 2 \neq 0 &\Rightarrow (x+1)(x-2) = 0 \Rightarrow \begin{cases} x_3 = -1 \\ x_4 = 2 \end{cases} \end{aligned}$$

$$D_f = \mathbb{R} - \{-2, -1, -1, 2, 0, 1, 2\}$$

② ص)

$$y = 1 - 4\sqrt{x-1} + \sqrt{x-1} \Rightarrow D_y = [1, +\infty)$$

$x=4 \quad x=1$

ب- ٢) $\sqrt{x-1} + \sqrt{y+1} = 2$, $\sqrt{y+1} = 2 - \sqrt{x-1} \rightarrow \sqrt{y+1} \geq 0 \rightarrow \sqrt{x-1} \leq 2 \rightarrow x \leq 5$

$\downarrow$
 $x-1 \geq 0 \rightarrow x \geq 1$

I, II $\rightarrow 1 \leq x \leq 5 \rightarrow D_f = [1, 5]$

$$\sin \frac{\pi}{4} = \frac{\sqrt{2}}{2} \quad \text{فرق دانه } (2n)^2 : (2n)^2$$

$$\cos 2\pi = 1 \quad 2(1+\sqrt{2})^2 - 4 - 2\sqrt{2} = -\frac{1}{2} \Rightarrow$$

$$f(1+\frac{\sqrt{2}}{2}) \Rightarrow f(\frac{2+\sqrt{2}}{2}) = (2+\sqrt{2})^2 - 4 + 2\sqrt{2}$$

$$4 + 4\sqrt{2} + 2 - 4 + 2\sqrt{2} = 2 + 4\sqrt{2}$$

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$$f(\frac{q+1}{q-1}) = q \Rightarrow$$

نسبت مساوی

$$\frac{q+1}{q-1} = q \Rightarrow \frac{q+1}{q-1} = q \Rightarrow \frac{q+1}{q-1} = q$$

$$\frac{q+1}{q-1} = q \Rightarrow q^2 - 1 = q + 1 \Rightarrow q^2 - q - 2 = 0 \Rightarrow (q-2)(q+1) = 0 \Rightarrow q = 2 \text{ or } q = -1$$

$$D_f = \mathbb{R} - \{1\}$$

$$f(g(q)) = -2 \rightarrow g^2 - 4g = -4 \Rightarrow g^2 - 4g + 4 = 0 \Rightarrow (g-2)^2 = 0 \Rightarrow g = 2$$

$$g(q) = 2$$

$$\sqrt{q^2 - 1} = 2 \Rightarrow q^2 - 1 = 4 \Rightarrow q^2 = 5 \Rightarrow q = \pm \sqrt{5}$$

$$f(n+1) - 2n + 1 = (n-1)(n-1)$$

$$f(-1) = f(-1+1) = (-1-1)(-1-1) = 4$$

$$f(1) = f(1+1) = (1-1)(1-1) = 0$$

$$f(1) \times f(-1) = 0 \times 4 = 0$$

$$f(\cos n (t \cos n + 1)) = \frac{\sin^2 n}{\cos^2 n}$$

$$\sin^2 n = 1 - \cos^2 n \Rightarrow \sin^2 n = 1 - \frac{1}{\cos^2 n} = \frac{\cos^2 n - 1}{\cos^2 n}$$

$$\tan^2 n = \frac{\sin^2 n}{\cos^2 n} \Rightarrow \frac{\cos^2 n - 1}{\cos^4 n} = \frac{1}{\cos^2 n} \Rightarrow \cos^2 n - 1 = 1 \Rightarrow \cos^2 n = 2$$

$$\cos^2 n + 1 \cos^2 n = 2 \Rightarrow 2 \cos^2 n = 2 \Rightarrow \cos^2 n = 1 \Rightarrow \cos n = \pm 1$$

$$\frac{-10 \pm \sqrt{100 + 4 \times 1 \times 1}}{2} = \frac{-10 \pm 11}{2} \Rightarrow \cos n = \frac{1}{2} \text{ or } \cos n = -\frac{1}{2}$$

$-\frac{1}{2} \rightarrow$ مایل نیست

$$\textcircled{v} \quad \frac{\frac{q+1}{q-1} + 1}{\frac{q+1}{q-1} - 1} = q \Rightarrow \frac{\frac{a+1+a-1}{a+1}}{\frac{q+1-q+1}{q-1}} = q \Rightarrow \frac{2q}{1} = q \Rightarrow D_f = 12-27$$

$-2a - 1 = 0$

$3 - 2(a) - (-2)^2 = 0 \rightarrow a = -\frac{1}{2}$: باید ریشه‌های عبارت زیر را پیدا کنند بنابراین:

$f(n) = \sqrt{3 - \frac{n}{2} - n^2} \rightarrow -n^2 - \frac{n}{2} + \frac{3}{2} = 0 \rightarrow n = \left(\frac{1}{2} \pm \sqrt{\frac{1}{4} + 12}\right) \times -\frac{1}{2}$ $n = -2$
 $\rightarrow n = \frac{5}{2} \rightarrow b = \frac{5}{2}$

$a + b = -\frac{1}{2} + \frac{5}{2} = 1$

$f(n) = 2n^2 - 2n = 2n^2 - 2n + 2 - 2 = 2(n^2 - n + 1) - 2 = 2(n-1)^2 - 2$ -4

$\sin \frac{\pi}{2} + \cos \frac{\pi}{2} = \sqrt{\frac{5}{2}} + 1 \rightarrow f(\sqrt{\frac{5}{2}} + 1) = 2(\sqrt{\frac{5}{2}} + 1 - 1)^2 - 2 = 2\left(\frac{5}{2}\right) - 2 = -\frac{1}{2}$