

نام خانوادگی نوشته شده است نه به صورتی که در صورتی

$\sin \frac{\pi}{3} = \frac{\sqrt{3}}{2} = \frac{1}{2}$ $\cos 2\pi = 1 = \frac{1}{2}$ $F(x) \rightarrow 2(1 + \frac{\sqrt{3}}{2})^2 - 4(1 + \frac{\sqrt{3}}{2}) + 2(1 + \sqrt{3} + \frac{\sqrt{3}}{2}) - 4\sqrt{3}$ $\rightarrow 2 + 2\sqrt{3} + \frac{3}{2} - 4 - 2\sqrt{3} = \frac{1}{2} - 2 = -\frac{3}{2}$	6 ✓
$F(f(x)) = \frac{f(x)+1}{f(x)-1} = \frac{\frac{x+1}{x-1}+1}{\frac{x+1}{x-1}-1} = \frac{\frac{x+1+x-1}{x-1}}{\frac{x+1-x+1}{x-1}} = \frac{2x}{2} = x$ برای هر $a \neq 1$ داریم $a-1 \neq 0 \rightarrow a \neq 1$ و $\frac{a+1}{a-1} \neq 1$ زیرا $a \neq 1$ $\rightarrow R = \{1\}$	7 ✓
$F(\sqrt{a^2-1}) = -f \rightarrow 2^2 - f^2 = -f \rightarrow t^2 - f^2 + f = 0 \rightarrow (t-f)^2 = 0 \rightarrow t = f$ $t = g(a) = \sqrt{a^2-1} \rightarrow g(a) = 2 \rightarrow \sqrt{a^2-1} = 2 \rightarrow a^2-1 = 4 \rightarrow a^2 = 5 \rightarrow a = \pm\sqrt{5}$	8 ✓
$(x+2) = 4 \rightarrow x = 2 \rightarrow 1 - 8 + 6 = -1 \rightarrow f(2) = -1$ $(x+2) = -3 \rightarrow x = -5 \rightarrow 34 + 25 + 6 = 65 \rightarrow f(-5) = 65$ $\sqrt{2 \times 2} = 1.41$	9 ✓
مسئله گفته شده یعنی $\frac{1}{2}$ و $\frac{3}{4}$ در $\frac{3}{4}$ صد می‌کند در هر دو حالت نسبت است با اینکه زیاد شده $\frac{3}{4}$ $\cos = t \rightarrow f^2 + \Delta f = \frac{1}{2} \rightarrow x^2 + 2x + 2x + 2x - 3 = 0 \rightarrow t = \frac{-2 \pm \sqrt{4 + 16}}{4}$ $= \frac{-2 \pm \sqrt{20}}{4} \rightarrow -1 \leq \cos x \leq 1 \rightarrow \frac{-2 - \sqrt{20}}{4} = \cos$ $\rightarrow f(\frac{3}{4}) = \tan^2 x \rightarrow \frac{1 - \cos^2}{\cos^2} = \frac{1}{\cos^2} - 1 = \frac{16}{(\sqrt{20} - 2)^2} - 1 \approx 11.23$	10 ✓

$$\frac{x-1}{x} - \frac{x}{x-1} \geq 0 \rightarrow \frac{(x-1)^2 - x^2}{x(x-1)} \geq 0 \rightarrow \frac{x^2 - 2x + 1 - x^2}{x(x-1)} \geq 0$$

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۱) $D = (-\infty, 0) \cup (1, \infty)$
 ۲) $D = (-\infty, -\frac{1}{2}] \cup [\frac{1}{2}, \infty)$
 ۳) $D = [1, 12]$
 ۴) $D = (-\infty, -1) \cup (1, \infty)$
 ۵) $D = (-\infty, -3] \cup [1, \infty)$

$$(3^{-x} - 3^2)(2^5 - 2^{2x}) \geq 0 \rightarrow (3^{-x} - 3^2)(2^5 - 2^{2x}) \geq 0 \rightarrow 3^{-x} = 3^2 \rightarrow x = -2, 5$$

$$2 - \sqrt{x+1} \geq 0 \rightarrow \sqrt{x+1} \leq 2 \rightarrow x+1 \leq 4 \rightarrow x \leq 3 \rightarrow D = [-1, 3]$$

$$(x^2 - x - 2) = (x-2)(x+1) \rightarrow x > 2 \text{ یا } x < -1$$

$$x^2 - 1 \geq 0 \rightarrow x > 1 \text{ یا } x < -1 \rightarrow D = (-\infty, -1) \cup (1, \infty)$$

$$x^2 + ax - x^2 \geq 0 \rightarrow x^2 + ax - x^2 \geq 0 \rightarrow x^2 + ax - x^2 \geq 0 \rightarrow x^2 + ax - x^2 \geq 0 \rightarrow x^2 + ax - x^2 \geq 0$$

$$x > 1 \rightarrow 3x - 2 = f(x) \rightarrow 3x^2 - x \geq 0 \rightarrow 2x \geq 2 \rightarrow x \geq 1$$

$$x < 1 \rightarrow f(x) = 2x + 3 \rightarrow 2x + 3 - x \geq 0 \rightarrow x \geq -3 \rightarrow D = [-3, 1]$$

تمام ریشه های معادله ها نباید در دامنه باشند! $x+1 \neq 0 \rightarrow x \neq -1$ $x \neq 0$ $x-1 \neq 0 \rightarrow x \neq 1$ **ب - ۱)**

$$x+2 \neq 0 \rightarrow x \neq -2 \quad ; \quad \frac{3}{x-1} + \frac{1}{x+2} \neq 0 \rightarrow \frac{3x+4+x-1}{(x-1)(x+2)} \neq 0 \rightarrow 4x+3 \neq 0 \rightarrow x \neq -\frac{3}{4}$$

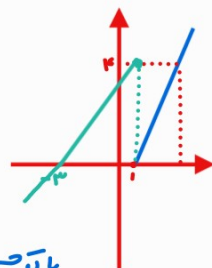
$$Df = \mathbb{R} - \left\{ -1, 0, 1, -2, -\frac{3}{4} \right\}$$

$$f(n) - n = \begin{cases} 3n-2-n & n \geq 1 \\ 3n+3-n & n < 1 \end{cases} = \begin{cases} 2n-2 & n \geq 1 \\ n+3 & n < 1 \end{cases}$$

$$f(n) - n \geq 0 \rightarrow \begin{cases} 2n-2 \geq 0 \rightarrow n \geq 1 \checkmark \\ n+3 \geq 0 \xrightarrow{n < 1} -3 \leq n < 1 \checkmark \end{cases}$$

$$\rightarrow Df = [-3, +\infty)$$

باتوجه به شکل نیز مشخص است!



$$f(\sqrt{c} \cdot s_n + \Delta \cdot c \cdot s_n) = f(\sqrt{c}, 0) \rightarrow \sqrt{c} \cdot s_n + \Delta \cdot c \cdot s_n = \sqrt{c}, \Delta \rightarrow \sqrt{c} \cdot s_n + \Delta \cdot c \cdot s_n - \frac{\sqrt{c}}{c} = 0. \quad -1 \checkmark$$

$$C \cdot s_n = \frac{-\Delta \pm \sqrt{\Delta^2 + \Delta^4}}{\Delta} \quad \rightarrow C \cdot s_n = \frac{-\Delta + 4}{\Delta} = \frac{1}{c}$$

$$\hookrightarrow C \cdot s_n = \frac{-\Delta - 4}{\Delta} = -\frac{\sqrt{c}}{c} \times C \cdot s_n \checkmark$$

$$\text{محدوده: } C \cdot s_{\frac{n}{c}} = \frac{1}{c}, \quad C \cdot s_{\frac{\Delta n}{c}} = \frac{1}{c} \quad \rightarrow f(\sqrt{c}, 0) = 3$$

$$\downarrow$$

$$\cos n = (\sqrt{c})^3 = 3$$

$$\downarrow$$

$$\cos n = (-\sqrt{c})^3 = 3$$