

$$\text{الف)} \quad \sqrt{\frac{(x-1)^2 - x^2}{x(x-1)}} = \sqrt{\frac{1-2x}{x(x-1)}}$$

$$\begin{array}{c} + \quad - \quad + \quad - \\ | \quad | \quad | \quad | \\ \frac{1}{x} \quad \frac{1}{x-1} \end{array}$$

$$\text{D} = (-\infty, 0) \cup \left[\frac{1}{2}, 1\right)$$

$$\text{ب)} \quad \frac{-x-2}{x(x+1)} = \frac{4x+5}{(x-1)(x+4)}$$

$$\text{D} = \mathbb{R} - \left\{0, -1, 1, -2, -\frac{5}{4}\right\}$$

$$\text{الف)} \quad \begin{array}{c} -2 \\ \nearrow \\ x \\ \searrow \\ \frac{5}{4} \end{array}$$

$$\begin{array}{c} + \quad - \quad + \\ | \quad | \quad | \\ \frac{1}{x} \quad \frac{5}{4} \end{array}$$

$$\text{D} = (-\infty, -2] \cup \left[\frac{5}{4}, +\infty\right)$$

$\sqrt{x+1}$ فقط در 0 تا $+\infty$ و 0 نباشد پس یعنی طرف دوم معادله و مساوی 0 قرار می‌گیرد و (ب)

بسیار است مقدار $\sqrt{x+1}$ و 3 باشد در صورتی که $x=1$ باشد

$$x=12 \rightarrow \sqrt{x+1} = 3 - \sqrt{11} = 0 \quad \text{D} = [1, 12]$$

$$x^2 - 2x - 2 > 0 \rightarrow (x-2)(x+1) > 0$$

$$\begin{array}{c} + \quad - \quad + \\ | \quad | \quad | \\ -1 \quad 2 \end{array} \quad \text{I}$$

$$\text{D} = \text{I} \cap \text{II} = (-\infty, -1) \cup (2, +\infty)$$

$$x^2 - 1 \geq 0 \rightarrow x^2 \geq 1 \rightarrow \begin{cases} x \geq 1 \\ x \leq -1 \end{cases} \quad \text{II}$$

$$-2b = 6$$

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$$\frac{1}{a} = \frac{1}{-2} \Rightarrow \frac{1}{-2} = \frac{1}{a} \Rightarrow 1 - 2a - 1 = 0 \rightarrow a = -\frac{1}{2}$$

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$$-(x^2 + \frac{1}{2}x - 3)$$

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

$$x^2 - 5x + 6 \rightarrow 6 = -2b = -3 \rightarrow b = \frac{3}{2}$$

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$$g(x) = \begin{cases} \sqrt{2x-2} & x \geq 1 \\ \sqrt{x+3} & x < 1 \end{cases}$$

$\rightarrow D = [1, +\infty)$

$\rightarrow D = \text{I} \cup \text{II} = [-3, +\infty)$

$\rightarrow D = [-3, 1) \cup \text{II}$

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$$\sin \frac{\pi}{4} = \frac{\sqrt{2}}{2} = f\left(\frac{1+\sqrt{2}}{2}\right) = 2\left(\frac{1+\sqrt{2}}{2}\right)^2 - 1\left(\frac{1+\sqrt{2}}{2}\right) = \frac{1+2\sqrt{2}+2}{2} - \frac{1+\sqrt{2}}{2} = \frac{1}{2} + \frac{\sqrt{2}}{2} = \frac{1+\sqrt{2}}{2}$$

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$$f(a) = \frac{a+1}{a-1} \rightarrow f(f(a)) = \frac{\frac{a+1}{a-1} + 1}{\frac{a+1}{a-1} - 1} = \frac{\frac{2a}{a-1}}{\frac{2}{a-1}} = a$$

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$$a \in \mathbb{R} - \{1\}$$

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$$\sqrt{a^2-1} = t$$

$$f(g(a)) = a^2 - 1 - \sqrt{a^2-1} = t^2 - t = -1$$

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$$t^2 - t + 1 = (t-1)^2 = 0$$

$$t = 1$$

$$t^2 = a^2 - 1 = 1$$

$$a^2 = 2$$

$$a = \pm \sqrt{2}$$

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$$x = 1 \rightarrow f(x) = 1 - 2 + 5 = 4$$

(9)

$$\rightarrow f(x) \times f(-x) = 4 \times 14 = 56$$

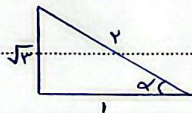
$$x = -5 \rightarrow f(-x) = 25 + 10 + 5 = 40$$

$$7\cos^2 + 2\cos = 3/5 \xrightarrow{\text{Solving}} \cos^2 + 2\cos - 14 = 0$$

(10)

$$(\cos + 7)(\cos - 14) = 0 \xrightarrow{\text{Solving}} \cos = \frac{1}{7} \rightarrow \frac{1}{7}$$

$$\cos = \frac{1}{7} \rightarrow \sqrt{1 - \frac{1}{49}} = \frac{\sqrt{48}}{7} \rightarrow \tan = \sqrt{48} \rightarrow \tan^2 = 48 = f(3/5)$$



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