

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

$$+ \quad | \quad - \quad | \quad + \quad | \quad -$$

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

□

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

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

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$$\text{الف) } x \rightarrow \begin{matrix} -2 \\ \frac{5}{4} \end{matrix}$$

$$+ \quad | \quad - \quad | \quad +$$

$$\mathbb{Q} = (-\infty, -2) \cup \left[\frac{5}{4}, +\infty\right)$$

□

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

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

$$x=12 \rightarrow \sqrt{x+1} = 3 - \sqrt{11} = 0$$

$$\mathbb{Q} = [1, 12]$$

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

$$+ \quad | \quad - \quad | \quad +$$

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

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

$$-2b = 6$$

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$$\frac{3}{a} = \frac{1}{-2} \Rightarrow \frac{3}{-2} = \frac{1}{a} \Rightarrow 3 - 2a - 1 = 0 \rightarrow a = -\frac{1}{2}$$

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

$$x^2 - 5x + 6 \rightarrow 6 - 2b = -3 \rightarrow b = \frac{9}{2}$$

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

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

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

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

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

$$\sin \frac{\pi}{4} = \frac{\sqrt{3}}{2} \Rightarrow f\left(\frac{2+\sqrt{3}}{2}\right) = 2\left(\frac{2+\sqrt{3}}{2}\right)^2 - 4\left(\frac{2+\sqrt{3}}{2}\right) = \frac{4+4\sqrt{3}+3}{2} - 4 - 2\sqrt{3} = \frac{7+4\sqrt{3}}{2} - 4 - 2\sqrt{3} = \frac{7}{2} - 2\sqrt{3} - 4 = \frac{7}{2} - \frac{8}{2} = -\frac{1}{2}$$

$$\cos 2x = 1$$

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

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

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

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

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

$$t = 1$$

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

$$a^2 = 2$$

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

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

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$$\rightarrow f(x) \times f(-x) = 4 \times 4 = 16$$

$$x = -5 \rightarrow f(-x) = 35 + 30 + 5 = 70$$

$$7 \cos^2 + 2 \cos = 3/5 \rightarrow 7 \cos^2 + 2 \cos - 3/5 = 0$$

(10)

$$(7 \cos + 3/5)(\cos - 1) = 0 \rightarrow \cos = \frac{3}{5} \rightarrow \frac{1}{5}$$

$$\cos = \frac{1}{5} \rightarrow \sqrt{1 - \cos^2} = \frac{\sqrt{24}}{5} \rightarrow \tan = \sqrt{24} \rightarrow \tan^2 = 24 = f(3/5)$$

