

$$f(x) = \sqrt{1-x^2} \quad 1-x^2 \geq 0 \rightarrow 1-x \leq 1 \quad D_f = [-1, 1]$$

$$D_f \cap D_g = \{-1, 0, 1\}$$

$$R_g = \{(-1, 2), (0, 1), (1, 0), (1, 1)\}$$

$$R_{g \circ f} = \begin{cases} x=1 \rightarrow R_{g \circ f} = 2 \\ x=0 \rightarrow R_{g \circ f} = 1 \\ x=-1 \rightarrow R_{g \circ f} = 2 \end{cases}$$

$$2+1+1=4$$

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$$f(x) = x-1 \rightarrow D = [3, +\infty) \xrightarrow{x=3} f(x) = 2 \quad R = [2, +\infty)$$

$$g(x) = \frac{1}{x} x + 3 \rightarrow D = (-\infty, 3] \xrightarrow{x=3} f(x) = 4 \quad R = (-\infty, 4]$$

$$R_{g \circ f} = (-\infty, 4] \cup [2, +\infty) = R = (2, 4)$$

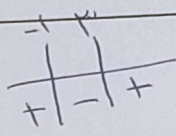
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$$\frac{-x^2 + x + 3}{x} > \frac{x}{x} \rightarrow \frac{-x^2 + x + 3}{x} > 1 \rightarrow \frac{-x^2 + x + 3 - x}{x} > 0 \rightarrow \frac{-x^2 + 3}{x} > 0$$

$$x=3$$

$$x=-1$$



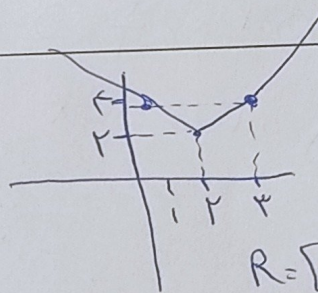
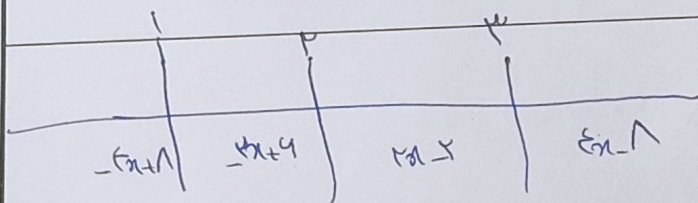
$$R = (-1, 3)$$

$$a=-1 \quad b=3$$

$$\sqrt{b-a} = \sqrt{3-(-1)} = 2$$

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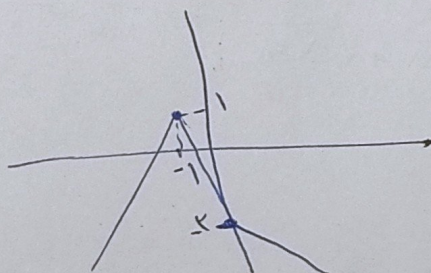
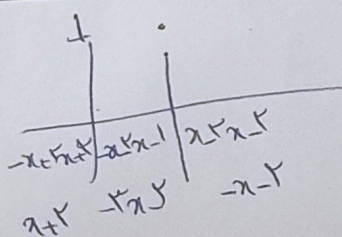


$$R = [2, +\infty)$$

$$2 = \text{حداقل مقدار}$$

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$$R = (-\infty, 1]$$

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$$y^2 + y = x^2 + \omega x + m \quad x^2 + x(\omega - y) + m - y = 0 \quad \Delta \geq 0 \quad (\omega - y)^2 - 4(m - y) = y^2 - 4y + \omega^2 - 4m \geq 0$$

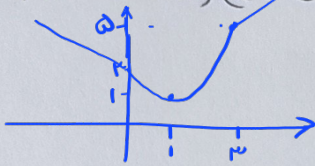
$$y^2 - 4y + \omega^2 \geq 4m - 4 \quad (y^2)^2 \geq 4m - 4$$

$$\begin{cases} m > 1 \rightarrow g = \sqrt{4m-4} \cup \overline{0, \omega} \\ m = 1 \quad R = \{1\} \cup \overline{0, \omega} \\ m < 1 \quad (y^2)^2 \geq 0 \quad \overline{1, \omega} \end{cases}$$

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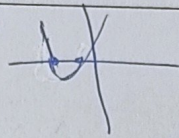
$$\begin{cases} x < 1 \rightarrow R = [\omega, +\infty) \\ x^2 - 2x + 1 \rightarrow R = [1, \omega) \\ 1 < x < 2 \rightarrow R = (x, +\infty) \end{cases} \quad R_g = [\omega, +\infty) \cup [1, \omega) \cup (1, +\infty) = [1, +\infty)$$



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$$\begin{cases} x^2 + 2x + 1 \quad x = -\frac{b}{2a} = -1 \quad y = -1 \quad R = [-1, +\infty) \\ [x] - x \rightarrow R = (-1, 0] \end{cases}$$



$$[-1, +\infty) \cup (-1, 0] = [-1, +\infty)$$

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$$x(x+3) \geq 0 \quad x \geq -3 \quad x \geq \frac{-3}{1} \quad D = [-\frac{3}{1}, +\infty) \quad b = -\frac{3}{1}$$

$$x = -\frac{3}{1} \rightarrow y = a + 1 = \omega \rightarrow a = \frac{3}{1}$$

$$a \times b = \frac{3}{1} \times (-\frac{3}{1}) = -9$$

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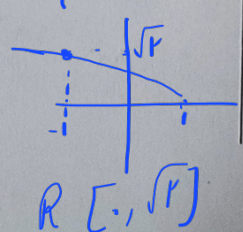
$$x+1 \geq 0 \quad x \geq -1 \quad 1-x \geq 0 \quad 1 \geq x \quad R = \textcircled{1} \cap \textcircled{2} = [-1, 1]$$

$$g(x) = \sqrt{x+1} - \sqrt{1-x} = \sqrt{x+1} - \frac{\sqrt{x+1}}{1-x} = \frac{(1-x)\sqrt{x+1} - \sqrt{x+1}}{1-x} = \frac{(1-x-1)\sqrt{x+1}}{1-x} = \frac{-x\sqrt{x+1}}{1-x}$$

$$f(x) + g(x) = \sqrt{x+1} + \frac{-x\sqrt{x+1}}{1-x} = \frac{(1-x)\sqrt{x+1} - x\sqrt{x+1}}{1-x} = \frac{(1-x-x)\sqrt{x+1}}{1-x} = \frac{(1-2x)\sqrt{x+1}}{1-x}$$

$$\rightarrow g(x) = \sqrt{1+x} - \sqrt{1-2x}$$

$$\frac{f(x)}{g(x)} = \frac{g(x)}{f(x)} = \sqrt{1-2x}$$



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