

$$f(x) + g(x) = a + b\sqrt{x+c} = \sqrt{(f+g)^2} \Rightarrow (f+g)^2 = (\sqrt{x-4}\sqrt{x-4} + \sqrt{x+4}\sqrt{x-4})^2 \Rightarrow$$

$$(f(x) + g(x))^2 = f^2(x) + g^2(x) + 2f(x)g(x) = x - 4\sqrt{x-4} + x + 4\sqrt{x-4} + 2\sqrt{x^2 - (4\sqrt{x-4})^2} =$$

$$2(x + \sqrt{x^2 - 16x + 64}) = 2(x + \sqrt{(x-4)^2}) = 2(x + |x-4|) \Rightarrow (f(x) + g(x))^2 = 4x - 16 \Rightarrow$$

$$f(x) + g(x) = \sqrt{4x - 16} = a + b\sqrt{x+c} \Rightarrow c = -4, b = 2, a = 0 \Rightarrow \frac{a+b}{c} = \frac{0+2}{-4} = -\frac{1}{2}$$

$$\frac{g(x)}{f(x)} = \frac{g(x)(x^2-5x+3)}{(x+2)} = \frac{g(x)(x-1)(x-3)}{x+2} \Rightarrow$$

$$\frac{g(x)}{f(x)} = \left\{ \left(2, \frac{(1)(2-1)(2-3)}{(2+2)} \right), \left(1, \frac{(0)(1-1)(1-3)}{(1+2)} \right), \left(3, \frac{(4)(3-1)(3-3)}{(3+2)} \right), \left(0, \frac{(4)(0-1)(0-3)}{0+2} \right) \right\} \Rightarrow$$

$$\frac{g(x)}{f(x)} = \left\{ \left(2, -\frac{1}{4} \right), \left(1, 0 \right), \left(3, 0 \right), \left(0, 6 \right) \right\}$$

$$f(x) = \left\{ \left(-\frac{1}{4}, 2 \right), \left(0, 1 \right), \left(0, 3 \right), \left(6, 0 \right) \right\}$$

$$f(x^2) = \left\{ (1, 2), (\sqrt{3}, 1), (2, 2) \right\}$$

$$2g^2(x) + 1 = \left\{ (-2, 14), (1, 2), (3, 9), (-1, 1) \right\}$$

$$2g^2(-2) + 1 = 2x(2)^2 + 1 = 19$$

$$2g^2(-1) + 1 = 2x(0) + 1 = 1$$

$$2g^2(1) + 1 = 2x(1)^2 + 1 = 3$$

$$2g^2(3) + 1 = 2x(3)^2 + 1 = 19$$

$$\frac{2f}{g} = \left\{ \left(1, \frac{4}{-1} \right), \left(3, \frac{-2}{2} \right), \left(-1, \frac{12}{0} \right) \right\} \Rightarrow \frac{2f}{g} = \left\{ (1, -4), (3, -1) \right\}$$

$$D_f = \{x \mid x \neq 0\}$$

$$D_g = \{x \mid x \neq k, k \in \mathbb{Z}\}$$

$$D_f \cap D_g = \{0, 3\}$$

$$h(x) = \left\{ (2, 2(1)+3), (-2, 2(0)+6), (2, 2(1)+3) \right\} \Rightarrow h(x) = \left\{ (2, 5), (-2, 6), (2, 5) \right\}$$

$$F(1) = \sqrt{\Delta(1)-(1)^2 - 4} = \sqrt{0} = 0 \text{ و } F(2) = \sqrt{\Delta(2)-(2)^2 - 4} = \sqrt{2} \text{ و } F(5) = \sqrt{\Delta(5)-(5)^2 - 4} = \sqrt{-4} \text{ غرضی}$$

$$F(4) = \sqrt{\Delta(4)-(4)^2 - 4} = \sqrt{0} = 0 \text{ و } g(x) = \{(1,3)(2,2)(4,2)(5,1)\}$$

$$h(x) = \frac{F(x)}{g(x)} \Rightarrow h(x) = \{(1, \frac{\sqrt{0}}{3})(2, \frac{\sqrt{2}}{2})(4, \frac{\sqrt{0}}{2})(5, 1)\} \Rightarrow h(x) = \{(1,0)(2, \frac{\sqrt{2}}{2})(4,0)(5,1)\}$$

دانی نتواند! در مجموع جزو دامنه تابع F نیست پس نمی تواند بداند $h(5)$ نیز بداند.

$$\text{الف)} y = x^2 - 3x^2 + 4x \Rightarrow y = \underbrace{x^2 - 3x^2 + 4x - 1 + 1}_{(x-1)^2} \Rightarrow (x-1)^2 = y-1 \Rightarrow x = \sqrt{y-1} + 1 \Rightarrow \mathbb{R}_F = \mathbb{R}$$

$$\text{ب)} y = \frac{1}{x^2 - 2x} \Rightarrow yx^2 - 2yx - 1 = 0 \Rightarrow \Delta \geq 0 \Rightarrow (-2y)^2 + (4y)(-1)(y) = 4y^2 + 4y = 4y \Rightarrow$$

$$4y(y+1) \geq 0 \Rightarrow \frac{-1}{+} \frac{0}{-} \frac{+}{+} \Rightarrow \mathbb{R}_F = (-\infty, -1] \cup [0, +\infty)$$

$$\text{الف)} \min \left| \frac{-b}{2a} = \frac{f}{y} = 2 \Rightarrow y \cdot (x)^2 + 10 - 4(x) = 4 \Rightarrow \mathbb{R}_F = [4, +\infty) \quad y = x^2 - 4x + 10 \text{ صورت مربع}$$

$$\text{ب)} \max \left| \frac{-b}{2a} = \frac{-y}{-y} = 1 \Rightarrow \max \left| \frac{y}{y} \right| \Rightarrow \mathbb{R}_F = [-\infty, 1] \quad y = -x^2 + 4x + 3 \text{ صورت مربع}$$

$$\text{ج)} \min \left| \frac{-b}{2a} = \frac{f}{y} = 2 \Rightarrow \min \left| \frac{y}{y} \right| \Rightarrow \mathbb{R}_F = \sqrt{[-1, +\infty)} = [0, +\infty) \quad y = x^2 - 2x - 3 \text{ صورت مربع}$$

$$\text{د)} \max \left| \frac{-b}{2a} = \frac{-y}{-y} = 2 \Rightarrow \max \left| \frac{y}{y} \right| \Rightarrow \mathbb{R}_F = \sqrt{[-\infty, 4]} \Rightarrow \mathbb{R}_F = [0, 2] \quad y = \sqrt{4x - x^2} \text{ صورت مربع}$$

$$\text{الف)} y = x^2 - 5x^2 + 2x + 1 \Rightarrow \mathbb{R}_F = \mathbb{R}$$

$$\text{ب)} y = x^2 - 4x^2 + 3x + 2 \Rightarrow \mathbb{R}_F = \mathbb{R}$$

$$\text{ج)} y = \sqrt{x^2 - 9x^2 + 5x + 1} \Rightarrow \mathbb{R}_F = \sqrt{\mathbb{R}} = [0, +\infty)$$

$$\text{د)} y = (x^2 - 4x^2 + 3x + 1)^2 \Rightarrow \mathbb{R}_F = (\mathbb{R})^2 = [0, +\infty)$$

$$\text{الف)} y = \frac{3x+1}{x-2} \quad \begin{array}{l} \text{میانبر عمودی} = \frac{a}{c} = 3 \\ \text{میانبر افقی} = 3x - 2 = 0 \Rightarrow x = \frac{2}{3} \\ \text{نقطه} A = \frac{y(0)}{0-2} = \frac{1}{-2} = -\frac{1}{2} \end{array} \quad \mathbb{R}_F = \mathbb{R} - \{3\}$$

$$\text{ب)} y = \frac{2x+1}{x+1} \quad \begin{array}{l} \text{میانبر عمودی} = \frac{a}{c} = 2 \\ \text{میانبر افقی} = x+1 = 0 \Rightarrow x = -1 \\ \text{نقطه} B = \frac{y(0)}{0+1} = \frac{1}{1} = 1 \end{array} \quad \mathbb{R}_F = \mathbb{R} - \{2\}$$