

آنین عالی نوشته ۱۹/۷۵

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

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

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

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

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

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

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

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

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

ب)  $2g^2(-2) + 1 = 2x(2)^2 + 1 = 19$   $2g^2(-1) + 1 = 2x(0) + 1 = 1$   
 $2g^2(1) + 1 = 2x(1)^2 + 1 = 3$   $2g^2(3) + 1 = 2x(2)^2 + 1 = 19$

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

۱)  $f = I) 2x \geq 0 \Rightarrow x \geq 0$   
 II)  $\sqrt{3x} \geq x \Rightarrow x \leq 3$   
 III)  $x - 2 \neq 0 \Rightarrow x \neq 2$

$\Rightarrow D_f = [0, 3] - \{2\}$  و  $g(x) = \frac{f(x)}{g(x)+1} \Rightarrow g(x)+1 \neq 0 \Rightarrow g(x) \neq -1$

$\Rightarrow D_g = \{x | x = k, k \in \mathbb{Z}\} \Rightarrow D_f \cap D_g \Rightarrow D_{\frac{f}{g+1}} = \{0, 1, 3\}$

عسنداره ن

ه)  $h = 2f + g \Rightarrow g(x) = \left\{ (5, 1), (-1, 2), (2, 3), (2, 2), (3, 3) \right\}$   
 $f(x) = \left\{ (4, 9), (2, 1), (-2, 0), (2, 0), (3, 1) \right\}$

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

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

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

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

دای تواریش! هرچون جزو دامنه تابع  $F$  نیست پس نمی تواند بدینا  $h(5)$  نیز بدهد.

$$\text{الف) } y = x^3 - 3x^2 + 2x \Rightarrow y = \frac{x^3 - 3x^2 + 2x - 1 + 1}{(x-1)^2} \Rightarrow (x-1)^2 = y-1 \Rightarrow x = \sqrt{y-1} + 1 \Rightarrow \mathbb{R}_f = \mathbb{R}$$

۱/۱۵

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

بافرض  $y \neq 0$  عبارت را درجه ۲ فرض کنید!

$$y(y+1) \geq 0 \Rightarrow \frac{-1}{2} \leq y \leq 0 \Rightarrow \mathbb{R}_f = (-\infty, -\frac{1}{2}] \cup [0, +\infty)$$

$$\text{الف) } \min \left| \frac{b}{ca} = \frac{F}{y} = 2 \Rightarrow y \cdot (x)^2 + 10 - F(x) = 4 \Rightarrow \mathbb{R}_f = [4, +\infty)$$

صورت مقلع  $y = x^2 - 4x + 10$

$$\text{ب) } \max \left| \frac{b}{ca} = \frac{-y}{y} = -1 \Rightarrow \max \left| \frac{y}{y} \right| \Rightarrow \mathbb{R}_f = (-\infty, 1]$$

صورت مقلع  $y = -x^2 + 4x + 10$

$$\text{ج) } \min \left| \frac{b}{ca} = \frac{F}{y} = 2 \Rightarrow \min \left| \frac{y}{y} \right| \Rightarrow \mathbb{R}_f = \sqrt{[-1, +\infty)} = [0, +\infty)$$

صورت مقلع  $y = x^2 - 4x + 10$

$$\text{د) } \max \left| \frac{b}{ca} = \frac{-y}{y} = -1 \Rightarrow \max \left| \frac{y}{y} \right| \Rightarrow \mathbb{R}_f = \sqrt{[-\infty, 1]} = [0, 1]$$

صورت مقلع  $y = \sqrt{4x - x^2}$

$$\text{الف) } y = x^3 - 5x^2 + 2x + 1 \Rightarrow \mathbb{R}_f = \mathbb{R}$$

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

$$\text{ج) } y = \sqrt{x^4 - 4x^3 + 5x + 1} \Rightarrow \mathbb{R}_f = \sqrt{\mathbb{R}} = [0, +\infty)$$

$$\text{د) } y = (x^5 - 4x^3 + 2x + 1)^2 \Rightarrow \mathbb{R}_f = (\mathbb{R})^2 = [0, +\infty)$$

$$\text{الف) } y = \frac{3x+1}{x-2}$$

عوض



میانب محودی  $= \frac{a}{c} = 3$

$$\mathbb{R}_f = \mathbb{R} - \{2\}$$

میانب افقی  $= 3x - 2 = 0 \Rightarrow x = 2$

$$y(2) = \frac{3(2)+1}{2-2} = \frac{7}{0} = A \text{ نقطه}$$

$$\text{عوض: } \mathbb{R}_f = \mathbb{R} - \{2\}$$

$$\text{ب) } y = \frac{2x+1}{x+1}$$

عوض



میانب محودی  $= \frac{a}{c} = 2$

$$\mathbb{R}_f = \mathbb{R} - \{2\}$$

میانب افقی  $= x+1 = 0 \Rightarrow x = -1$

$$y(-1) = \frac{2(-1)+1}{-1+1} = \frac{-1}{0} = B \text{ نقطه}$$

$$\text{عوض: } \mathbb{R}_f = \mathbb{R} - \{2\}$$

(الف)  $y = n^3 - 2n^2 + 2n - 1 + 1 = y = (n-1)^3 + 1$  (v)

$$y-1 = (n-1)^3 \rightarrow \sqrt[3]{y-1} = n-1 \rightarrow n = \sqrt[3]{y-1} + 1$$

$R_f = \mathbb{R}$

(ب)  $y = \frac{1}{n^2 - 2n} \rightarrow n^2 y - 2ny = 1 \rightarrow n^2 y - 2ny - 1 = 0$

$y \neq 0 \rightarrow n = \frac{2y \pm \sqrt{4y^2 + 4y}}{2y} \rightarrow 4y(y+1) \geq 0 \rightarrow \frac{-1}{+} \frac{0}{+}$

$y = 0 \rightarrow 0 = 1 \times$  صفتی وجود ندارد!  $\rightarrow R_f = (-\infty, -1] \cup (0, +\infty)$