

۱۹، ۱۷۵ آذین

مجموعه جوابی: $x \in [-1, 3]$

$$f(x) + g(x) = \sqrt{x+4}\sqrt{x-4} + \sqrt{x-4}\sqrt{x-4} \xrightarrow{\text{تساوی}} (f(x) + g(x))^2 = 4x + 4\sqrt{x^2 - 14x + 44}$$

$$\xrightarrow{x \geq 4} (f(x) + g(x))^2 = 4x + 4\sqrt{x^2 - 14x + 44} \Rightarrow f(x) + g(x) = 2\sqrt{x-4} \Rightarrow a=0, b=2, c=-4$$

$$\frac{a+b}{c} = \frac{-1}{2} \quad \text{پ}$$

$$\frac{g}{f} = \left\{ \left(2, \frac{1}{2} \right), \left(4, 1 \right) \right\} \quad \text{پ}$$

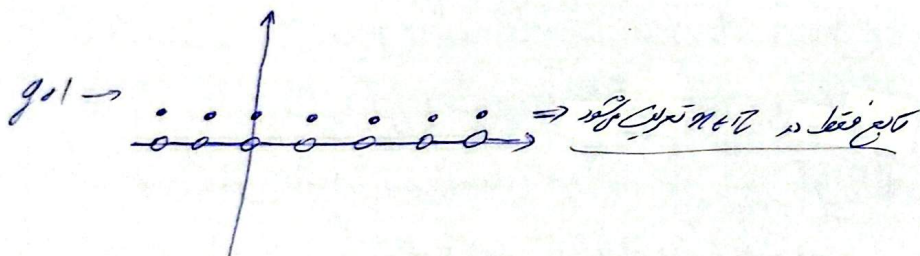
$$\text{Cdd)} f(x) = \left\{ (0, 4), (1, 1), (2, 2), (4, 4) \right\}$$

$$\text{ب)} f(x^2) = \left\{ (1, 2), (-1, 2), (2, 1), (-2, 1), (4, 4), (-4, 4) \right\}$$

$$\text{ج)} 2g^2(x) + 1 = \left\{ (-2, 1), (1, 4), (2, 9), (-1, 4) \right\} \quad \text{پ}$$

$$\text{د)} \frac{f^2}{g} = \left\{ (1, -4), (4, -1) \right\}$$

$$h = 2f + g = \left\{ (2, 4), (4, 4), (-2, 4) \right\} \quad \text{پ}$$



$$x - 2 \neq 0 \Rightarrow x \neq 2$$

$$x \geq 0 \Rightarrow x \geq 0$$

$$\sqrt{4x} - x \geq 0 \Rightarrow \sqrt{4x} \geq x \xrightarrow{x \geq 0} 4x \geq x^2 \Rightarrow 0 \leq x \leq 4$$

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

$$\frac{f(x)}{g(x)} = \frac{\sqrt{1-x-4}}{2} = \frac{\sqrt{-3-x}}{2}$$

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$$a) y = x^r - (x-1)^r \rightarrow y-1 = (x-1)^r \Rightarrow x-1 = \sqrt[r]{y-1} \Rightarrow x = \sqrt[r]{y-1} + 1$$

$$\Rightarrow R_f = \mathbb{R}$$

$$b) x^r - rx = 1 \xrightarrow{+y} (x^r - rx + 1)y = 1+y \Rightarrow (x-1)^r y = 1+y$$

$$\Rightarrow (x-1)^r = \frac{1+y}{y} \Rightarrow x-1 = \sqrt[r]{\frac{1+y}{y}} \Rightarrow x = \sqrt[r]{\frac{1+y}{y}} + 1$$

$$\Rightarrow y \neq 0, \frac{1+y}{y} \geq 0 \Rightarrow \frac{-1}{0} \frac{0}{0}$$

$$R_f = (-\infty, -1) \cup (0, \infty)$$

$$c) y = x^r - kx + 10 \rightarrow y_{ext} = \frac{-b}{ka} = \frac{-(4-10)}{1} = 6 \Rightarrow R_f = [6, \infty)$$

$$d) y = -x^r + 4x + 1 \rightarrow x_{ext} = \frac{-b}{ka} = \frac{-4}{-1} = 4 \Rightarrow y_{ext} = -9 + 16 + 1 = 7 \Rightarrow R_f = [7, \infty)$$

$$e) y = \sqrt{x^r + x - 1} \rightarrow y_{ext} = \frac{-b}{ka} = \frac{-(-4-1)}{1} = -5 \Rightarrow R_f = [-5, \infty) \Rightarrow R_f = [0, \infty)$$

$$f) y = \sqrt{-x^r + 4x} \rightarrow x_{ext} = \frac{-b}{ka} = \frac{-4}{-1} = 4 \Rightarrow y_{ext} = 4 \Rightarrow R_f = [-\infty, 4] \Rightarrow R_f = [0, 4]$$

$$g) y = x^r - 2x^r + x + 1 \rightarrow x_{ext} = 1 \Rightarrow R_f = \mathbb{R}$$

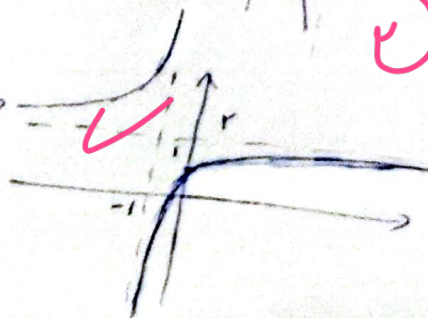
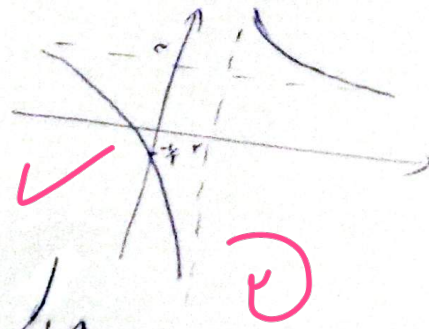
$$h) y = x^r - 4x^r + x + 1 \rightarrow x_{ext} = 1 \Rightarrow R_f = \mathbb{R}$$

$$i) \sqrt{x^r - 4x^r + x + 1} = y \rightarrow R_f = \sqrt{\mathbb{R}} = [0, \infty)$$

$$j) y = (x^r - 4x^r + x + 1)^r \Rightarrow R_f = (\mathbb{R})^r = [0, \infty)$$

$$k) y = \frac{x+1}{x-1} \rightarrow R_f = \mathbb{R} - \{1\}$$

$$l) y = \frac{x+1}{x-1} \rightarrow R_f = \mathbb{R} - \{1\}$$



$$\mathcal{D}h = \mathcal{D}f \wedge \mathcal{D}g \rightarrow \mathcal{D}h = \{r, -r, r\}$$

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$$h(u) = rf(u) + g(u) \rightarrow h = \{(r, a)(-r, 4)(r, a)\}$$