

پاسخنامه تشریحی تکلیف شماره ...

۱. $g(x) = \sqrt{x-4} \sqrt{x-4}$ $f(x) = \sqrt{x-4} \sqrt{x-4}$ $\sqrt{x-4} = t$

$x > 4 \rightarrow \sqrt{x-4} > 0 \rightarrow \sqrt{x-4} \geq 0 \rightarrow t^2 = x-4 \rightarrow x = t^2 + 4$ $\frac{a+b}{c} = \frac{0+2}{-1} = -2$

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

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

$\begin{cases} a=0 \\ b=2 \\ c=-4 \end{cases}$

۲. $g(x) = \{(2,1)(1,0)(0,4)\}$ $f(x) = \frac{x+2}{x^2-4x+3}$

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

$\frac{g}{f} \Rightarrow \{(2, \frac{1}{4})(0, \frac{1}{4})\} \Rightarrow (2, \frac{1}{4})(0, \frac{1}{4})$

۳. $g(x) = \{(-2,2)(1,-1)(2,2)(-1,0)\}$ $f(x) = \{(1,2)(2,-1)(3,2)(-1,4)\}$

$\Rightarrow f(x) \Rightarrow x=1 \rightarrow x=\frac{1}{x} \Rightarrow x=2 \rightarrow x=\frac{1}{2} \Rightarrow x=3 \rightarrow x=\frac{1}{3} \Rightarrow x=-1 \rightarrow x=-1$

$f(x) = \{(1,2)(2,-1)(3,2)(-1,4)\}$ $f(x^2) = \{(1,2)(2,-1)(3,2)(-1,4)\}$

$g(x^2) = \{(-2,2)(1,-1)(2,2)(-1,0)\}$ $g(x^2) = \{(-2,2)(1,-1)(2,2)(-1,0)\}$

$\Rightarrow \frac{g}{f} \Rightarrow \{(1, \frac{1}{2})(-1, \frac{1}{2})(2, \frac{1}{2})(-1, \frac{1}{2})\} \Rightarrow \{(1, -\frac{1}{2})(2, -1)\}$

۴. $g = \{(0,1)(2,2)(-1,4)(-1,2)(2,5)\}$ $f(x) = \{(2,1)(2,-1)(4,1)(-1,0)\}$

$h = 2f + g \Rightarrow (2,2)(1,1)(2,3)(-2,4)(-1,9)$

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

$x \in \mathbb{Z} \rightarrow g = 0$ $x \notin \mathbb{Z} \rightarrow g = -10x \Rightarrow D_g = \mathbb{Z} \setminus \mathbb{N}$

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

$g+1 \neq 0 \rightarrow g \neq -1$

$D_f = \{0, 1, 2\} \cap \mathbb{N}$

$$g(x) = \{(b^2)(2,2)(5,4)(\Delta,1)\}$$

$$f(x) = \{(1,0)(2,\sqrt{2})(3,\sqrt{2})(4,0)\}$$

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

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$$y = x^2 - 3x^2 + 3x \Rightarrow (x-1)^2 = y-1 \Rightarrow (x-1) = \sqrt{y-1} \Rightarrow R_f = R$$

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

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

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

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

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الف) $x^2 - 4x + 1 \rightarrow S \mid x_s = \frac{b}{2a} = \frac{4}{2} = 2 \Rightarrow R_f = [2, +\infty)$

ب) $-x^2 + 4x + 3 \rightarrow S \mid x_s = \frac{b}{2a} = \frac{4}{-2} = -2 \Rightarrow R_f = (-\infty, 12]$

ج) $\sqrt{x^2 - 4x - 3} \rightarrow S \mid x_s = \frac{b}{2a} = \frac{4}{2} = 2 \Rightarrow R_f = [2, +\infty)$

د) $\sqrt{4x - x^2} \rightarrow S \mid x_s = \frac{b}{2a} = \frac{4}{-2} = -2 \Rightarrow R_f = [0, 4]$

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الف) $y = x^2 - 4x^2 + 2x + 1 \rightarrow R_f = 'R$

ب) $y = x^2 - 4x^2 + 2x + 1 \rightarrow R_f = 'R$

ج) $\sqrt{x^2 - 4x^2 + 2x + 1} \rightarrow R_f = [0, +\infty)$

د) $(x^2 - 4x^2 + 2x + 1)^2 \rightarrow R_f = [0, +\infty)$

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الف) $y = \frac{2x+1}{x-2} \Rightarrow R_f = 'R - \{ \frac{1}{2} \} \Rightarrow R_f = 'R - [\frac{1}{2}] \rightarrow 'R - [2]$

ب) $y = \frac{2x+1}{x+1} \Rightarrow R_f = 'R - [\frac{1}{2}]$