

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

$$\Rightarrow f(x) + g(x) = a+b\sqrt{x+c} = A \quad \frac{a+b}{c} = ?$$

$$A = (\sqrt{x+4}\sqrt{x-4} + \sqrt{x-4}\sqrt{x-4})^2 = x+4\sqrt{x-4} + x-4\sqrt{x-4} + 2\sqrt{x^2-16} + 4 = 2\sqrt{x^2-16} + 4$$

$$2x + 2\sqrt{(x-4)^2} \Rightarrow 2x + 2(x-4) = 4x-8 = 4(x-2) \quad A = \sqrt{4(x-2)} = a+b\sqrt{x+c}$$

$$A = 2\sqrt{x-2} \quad a=0 \quad b=2 \quad c=-2 \quad \frac{a+b}{c} = \frac{2}{-2} = -1$$

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$$f(x) = \frac{x+2}{x^2-4x+3} \quad g(x) = \{(2,1), (1,0), (3,0), (0,4)\} \quad D_f = \mathbb{R} - \{1,3\}$$

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

$$f(2) = \frac{4}{4-8+3} = \frac{4}{-1} = -4 \quad f(0) = \frac{2}{0-0+3} = \frac{2}{3}$$

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

$$g(x) = \{(-2,3), (1,-1), (3,2), (-1,0)\}$$

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

$$f \circ f(x) = \{(-1,2), (1,2), (\sqrt{3}, -1), (-\sqrt{3}, -1), (-2,2), (2,2)\}$$

$$g \circ g(x) = \{(-2,1), (1,3), (3,9), (-1,1)\}$$

$$g \circ f(x) = \{(1,-4), (3,-1), (-1, \frac{4}{3})\}$$

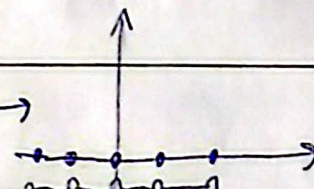
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$$f(x) = \{(2,1), (3,1), (4,9), (-2,0)\} \quad g(x) = \{(0,1), (2,3), (-2,4), (-1,2), (3,3)\}$$

$$h = f \circ g = \{(2,8), (3,8), (-2,4)\}$$

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$$f(x) = \frac{\sqrt{3x} - x}{x-2} \quad g(x) = [x] + [-x] \rightarrow$$



$$D_{\left[\frac{f}{g+1}\right]}(x) = D_f \cap D_{g+1} = \left\{ \begin{array}{l} g(x)+1=0 \\ g(x)=-1 \\ x \in \mathbb{R}-\mathbb{Z} \end{array} \right\} = \{0, 1, 3\}$$

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$$D_f = [0,3] - \{2\}$$

$$D_g = \mathbb{R}$$

$$\sqrt{3x} - x > 0 \quad 3x > 0 \quad x > 0 \quad x \neq 2$$

$$\sqrt{x} \geq t \quad -t^2 + \sqrt{3}t \geq 0 \quad 0 < -t + \sqrt{3} \leq \sqrt{3}$$

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

$$h(x) = \frac{f(x)}{g(x)} = \{(1, 0), (2, \frac{\sqrt{2}}{2}), (3, 0)\}$$

$$D_f = [1, 4]$$

$$\begin{aligned} 2x - x^2 - 4 &\geq 0 \\ -x^2 + 2x - 4 &\geq 0 \\ x &\in [1, 4] \end{aligned}$$

$$-\frac{1}{q} + \frac{1}{p} =$$

$$f(1) = \sqrt{0} = 0$$

$$f(2) = \sqrt{2}$$

$$f(3) = 0$$

$$\text{الف) } y = x^3 - 3x^2 + 3x - 1 \Rightarrow y - 1 = (x - 1)^3$$

$$\sqrt[3]{y - 1} = x - 1 \Rightarrow \sqrt[3]{y - 1} + 1 = x \quad R_f = \mathbb{R}$$

$$\text{ب) } y = \frac{1}{x^2 - 2x}$$

$$y(x^2 - 2x) - 1 = 0$$

$$y \neq 0 \quad x = \frac{2y \pm \sqrt{4y^2 + 4y}}{2y} \rightarrow 4y^2 + 4y \geq 0 \Rightarrow y^2 + y \geq 0$$

$$y \geq 0 \quad -1 \geq 0 \quad X$$

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

$$\frac{y(1+y) - 1}{y^2 - 1} = \frac{y^2 + y - 1}{y^2 - 1}$$

$$\text{الف) } y = x^2 - 5x + 10$$

$$\min \left| \frac{-b}{2a} = \frac{5}{2} = 2.5 \right|$$

$$R_f = [4, \infty)$$

$$\text{ب) } y = -x^2 + 4x + 3$$

$$\max \left| \frac{-b}{2a} = \frac{-4}{-2} = 2 \right|$$

$$R_f = (-\infty, 12]$$

$$\text{ج) } y = \sqrt{x^2 - 5x - 3}$$

$$\min \left| \frac{-b}{2a} = \frac{5}{2} = 2.5 \right|$$

$$R_f = \sqrt{[-1, \infty)} = [0, \infty)$$

$$\text{د) } y = \sqrt{4x - x^2}$$

$$\max \left| \frac{-b}{2a} = \frac{-4}{-2} = 2 \right|$$

$$R_f = \sqrt{(-\infty, 4]} = [0, 2]$$

$$\text{الف) } y = x^3 - 2x^2 + 2x + 1$$

$$R_f = \mathbb{R}$$

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

$$R_f = \mathbb{R}$$

$$\text{ج) } y = \sqrt{x^3 - 4x^2 + 2x + 1}$$

$$R_f = \sqrt{\mathbb{R}} = [0, \infty)$$

$$\text{د) } y = (x^3 - 2x^2 + 3x + 1)^2$$

$$R_f = (\mathbb{R})^2 = [0, \infty)$$

$$\text{الف) } y = \frac{3x+1}{x-2}$$

$$R_f = \mathbb{R} - \{3\}$$

$$\text{ب) } y = \frac{2x+1}{x+1}$$

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