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

$$h(x) = \frac{f(x)}{g(x)} = 1 \quad -x^2 + 4x - 4 \geq 0$$

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

$$f(1) = 0$$

$$f(2) = 2$$

$$f(4) = 0$$

$$x^2 - 4x + 4 \leq 0$$

$$[1,4]$$

2

$$\text{الف) } y = x^3 - 3x^2 + 3x \quad \mathbb{R}$$

$$\text{ب) } y = \frac{1}{x^2 - 2x}$$

$$yx^2 - 2yx = 1$$

$$yx^2 - 2yx - 1 = 0$$

$$x = \frac{2y \pm \sqrt{4y^2 + 4y}}{2y}$$

$$xy^2 + 4y \geq 0$$

$$xy(y+1) \geq 0$$

$$\frac{-1 \pm \sqrt{1+4}}{2} = \frac{-1 \pm \sqrt{5}}{2}$$

$$\text{II: } xy \neq 0 \quad y \neq 0$$

$$\text{الف) } y = x^2 - 4x + 10 \quad \frac{f}{y} = 2 \quad [4, +\infty)$$

$$\text{ب) } y = -x^2 + 4x + 3 \quad \frac{-y}{-2} = 2 \quad (-\infty, 12]$$

$$\text{ج) } y = \sqrt{x^2 - 4x - 3} \quad \frac{f}{y} = 2 \quad \sqrt{[4, +\infty)} = [5, +\infty)$$

$$\text{د) } \sqrt{4x - x^2} \quad \frac{-y}{-2} = 2 \quad \sqrt{[-\infty, 4]} = [0, 4]$$

$$\text{الف) } \mathbb{R}$$

$$\text{ب) } \mathbb{R}$$

$$\text{ج) } \sqrt{\mathbb{R}} = [0, +\infty)$$

$$\text{د) } \mathbb{R}^2 = [0, +\infty)$$

$$\text{الف) } y = \frac{3x+1}{x-2} \quad \mathbb{R} - \left\{\frac{a}{c}\right\} \quad \mathbb{R} - \{2\}$$

$$\text{ب) } y = \frac{2x+1}{x+1} \quad \mathbb{R} - \{2\}$$