

$f(x) = \sqrt{x+4} \sqrt{x-4} \xrightarrow{\text{ربع کامل}} \sqrt{(x-4)+4} \sqrt{x-4} = \sqrt{x-4+4} \sqrt{x-4} \rightarrow \sqrt{x-4+4} \sqrt{x-4}$   
 $g(x) = \sqrt{x-4} \sqrt{x-4} \rightarrow (x-4) - 4\sqrt{x-4} + 4 \rightarrow \sqrt{x-4-4} \sqrt{x-4} \rightarrow \sqrt{x-4-4} \sqrt{x-4}$   
 $f(x) + g(x) = a + b\sqrt{x+c}$   
 $\frac{a+b}{c} = \frac{2}{-4} \rightarrow \frac{-1}{2} \rightarrow \frac{-1}{2} \sqrt{x-4} = a + b\sqrt{x+c}$   
 $b=2 \quad c=-4$

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

$r f(x) = (1, 4) (3, 2) (4, 4) (-1, 12)$   
 $f(x) = (1, 2) (3, -1) (4, 2) (-1, 4)$   
 $g(x) = (-2, 3) (1, -1) (3, 2) (-1, 0)$   
 $f(x) = (1, 2) (3, -1) (4, 2) (-1, 4)$   
 $\frac{r f}{g} = (1, -4) (3, -1) (-1, \frac{12}{3})$

$f(x) = (2, 1) (3, 1) (4, 9) (-2, 0)$   
 $g = (5, 1) (2, 3) (-2, 4) (-1, 2) (3, 3)$   
 $h = r f + g = (2, 5) (3, 5) (-2, 4)$

$f(x) = \frac{\sqrt{3x-x}}{x-2} \rightarrow \sqrt{3x-x} > 0 \quad \sqrt{3x-x} > x \quad 3x-x^2 > 0$   
 $x(3-x) > 0 \rightarrow x \in [0, 3]$   
 $g(x) = [x] + [-x] \rightarrow \begin{cases} 0 & x \in \mathbb{Z} \\ -1 & x \notin \mathbb{Z} \end{cases}$   
 $D = \{0, 3\}$

$$f(n) = \sqrt{\frac{5n - n^2 - 4}{0 - 1 - 1}} \quad (1, 0) (2, \sqrt{2}) (4, 0) (5, \sqrt{2})$$

$$g(n) = (1, 2) (2, 2) (3, 2) (5, 1)$$

$$\frac{f(n)}{g(n)} = (1, 0) (2, \frac{\sqrt{2}}{2}) (4, 0) \quad \text{د}$$

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$$الف) y = x^3 - 3x^2 + 3x$$

برداشت املی:

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

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

با فرض  $y \neq 0$  عبارت! درجه ۲ فرض کنیم!

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$$R = (-\infty, -1] \cup [0, +\infty)$$

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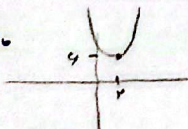
$$ب) y = \frac{1}{x^2 - 2x} \quad x^2y - 2xy = 1 \quad \Delta > 0 \quad 4y^2 - 4(-y) > 0 \quad 4y(y+1) > 0$$

$$x^2y - 2xy = 0 \quad \Delta > 0 \quad 4y^2 + 4y > 0 \quad y = 0 \quad y = -1$$

$$الف) y = x^2 - 4x + 10$$

$$\frac{-b}{2a} = \frac{4}{2} = 2$$

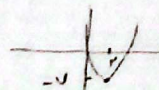
$$\frac{4 - 16 + 10}{-2} = -1 \rightarrow R = [4, +\infty)$$



$$ب) y = \sqrt{x^2 - 4x - 3}$$

$$\frac{x}{y} = 2 = x \quad y = \frac{-11}{-2} = -5.5$$

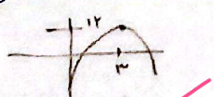
$$\sqrt{[-5.5, +\infty)} \rightarrow [0, +\infty) = R$$



$$ب) y = -x^2 + 4x + 3$$

$$\frac{-4}{-2} = 2$$

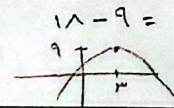
$$-9 + 16 + 3 = 10 \rightarrow R = (-\infty, 10]$$



$$ا) y = \sqrt{4x - x^2}$$

$$\frac{-4}{-2} = 2 \quad 16 - 9 = 9$$

$$\sqrt{(-\infty, 4]} \rightarrow [0, 4] = R$$



$$الف) R$$

$$ب) R$$

$$ج) \sqrt{R} = [0, +\infty) = R$$

$$د) y = (x^2 - 4x^2 + 3x + 1) = [0, +\infty) = R$$

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$$الف) \frac{x^2 + 1}{x^2 - 3} = y$$

$$x = \frac{xy + 1}{y - 3} \rightarrow y \neq 3 \rightarrow R - \{3\}$$

$$(I) xy - 3y = x^2 + 1$$

$$(II) \frac{1}{y} \rightarrow R = \mathbb{R} - \{\frac{1}{3}\} \rightarrow \mathbb{R} - \{\frac{3}{1}\}$$

$$ب) y = \frac{x^2 + 1}{x + 1}$$

$$R - \{3\} / \frac{1}{y} \rightarrow xy + y = x^2 + 1$$

$$x(1 - y) + 1 = y \quad x = \frac{y - 1}{1 - y} \rightarrow R - \{1\}$$

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

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

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

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