

$$t = \sqrt{x-r} \Rightarrow t^2 = x-r, x = t^2 + r \Rightarrow f(x) = \sqrt{(t^2+r)+r}t = \sqrt{(t+r)^2} = |t+r|$$

$$g(x) = \sqrt{t^2+r-r} = \sqrt{(t-r)^2} = |t-r| \Rightarrow f(x) + g(x) = t+r+t-r = 2t$$

$$t = \sqrt{x-r} \rightarrow 2\sqrt{x-r} = \frac{a}{b} + \frac{c}{d}\sqrt{x+r} \Rightarrow \frac{(0)+r}{-r} = \boxed{-\frac{1}{r}}$$

$$f(x) = \frac{x+r}{(x-r)(x-1)} \Rightarrow D_f = \mathbb{R} - \{r, 1\} / D_g = \{r, 1, r, 0\}$$

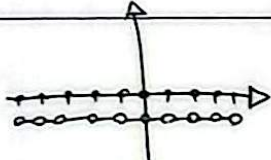
$$D_f \cap D_g = \{r, 0\} \rightarrow \frac{g}{f} = \left\{ \left(r, \frac{1}{-r} \right), \left(0, \frac{r}{-r} \right) \right\}$$

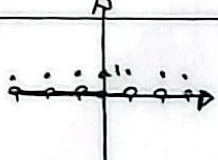
$$1) f(x) = \left\{ \left(\frac{1}{r}, r \right), \left(\frac{r}{r}, -1 \right), \left(r, r \right), \left(-\frac{1}{r}, r \right) \right\} / (-) f(x) = \left\{ (1, r), (-1, r\sqrt{r-1}), (-\sqrt{r-1}, 1), (r, r), (-r, r) \right\}$$

$$2) \frac{g}{f}(x) + 1 = \left\{ (-r, 1), (1, r), (r, r), (-1, 1) \right\} /$$

$$3) D_f \cap D_g = \{1, r, -1\} \rightarrow \frac{r}{f} = \left\{ (1, -r), (r, -1), (-1, r) \right\} = \frac{r}{f} = \left\{ (1, -r), (r, -1) \right\}$$

$$D_f \cap D_g = \{r, r, -r\} \rightarrow h = r f + g = \left\{ (r, 0), (r, 0), (-r, r) \right\}$$

$$g(x) = [x] + [-x] \rightarrow$$


$$+1 \rightarrow [x] + [-x] + 1$$


$x \in [0, r]$

$$f(x) \rightarrow \textcircled{1} \sqrt{rx} \rightarrow x \geq 0 / \textcircled{2} \sqrt{rx} - x \geq 0 \rightarrow \dots / \textcircled{3} x-r \neq 0 \Rightarrow x \neq r$$

$([0, r] - \{r\})$

$$D_{\frac{f}{g+1}} = \underbrace{g(x)}_{\textcircled{1}} \cap \underbrace{f(x)}_{\textcircled{2}} - \underbrace{\{x | g(x+1) = 0\}}_{\textcircled{3}} = \mathbb{R} \cap \dots - \{x | x \neq \mathbb{Z}\}$$

$$D_{\frac{f}{g+1}} = \left\{ x | x = k, k \in [0, r] - \{r\}, k \notin \mathbb{Z} \right\}$$

$f(x) = \sqrt{-(x^2 - 5x + 4)} = \sqrt{(-x+4)(x-1)}$ $\Rightarrow D_f = [1, 4]$ و $g(x) = \{1, 2, 4, \omega\} \rightarrow D_f \cap D_g = \{1, 2, 4\}$ $h(x) = \left\{ (1, 0), (2, \frac{\sqrt{2}}{2}), (4, 0) \right\}$	6
$y = x^2 - 2x^2 + 2x + 1 - 1 = (x-1)^2 + 1 \rightarrow y-1 = (x-1)^2 \rightarrow \sqrt{y-1} = x-1$ $\Rightarrow D_{R_f} = \mathbb{R}$ $-) y(x^2 - 2x) = 1 \rightarrow yx^2 - 2xy - 1 = 0 \xrightarrow{\Delta} 4y^2 + 4y = \Delta \Delta \geq 0$ $\rightarrow 4y^2 + 4y \geq 0 \rightarrow 4y(y+1) \geq 0 \xrightarrow{\frac{-1}{2} \pm \frac{1}{2}} \Rightarrow R_g = (-\infty, -1] \cup [0, +\infty)$	7
الف) $y = x^2 - 4x + 10 \rightarrow x_s = \frac{-b}{2a} = 2, y_s = (2)^2 - 4(2) + 10 = 2 \Rightarrow a > 0 \rightarrow R = [2, +\infty)$ ب) $y = -x^2 + 4x + 3 \rightarrow x_s = 2 \rightarrow y_s = -(2)^2 + 4(2) + 3 = 7 \Rightarrow a < 0 \Rightarrow R = (-\infty, 7]$ ج) $x_s = \frac{-(-4)}{2(1)} = 2, y_s = (2)^2 - 4(2) - 3 = -7 \xrightarrow{a > 0} R = [-7, +\infty) \xrightarrow{\sqrt{\cdot}} [0, +\infty) = \mathbb{R}$ د) $x_s = \frac{-6}{-2} = 3, y_s = 9 \xrightarrow{a < 0} (-\infty, 9] \xrightarrow{\sqrt{\cdot}} R = [0, 3]$	8
الف) $x^{(3)} \rightarrow$ بزرگترین مرتبه فرد است $\rightarrow R = \mathbb{R}$ / ب) $x^{(2)} \rightarrow$ فرد $\Rightarrow R = \mathbb{R}$ ج) $\mathbb{R} =$ زوج بدون رادیکال $\xrightarrow{\sqrt{\cdot}} [0, +\infty) = \mathbb{R}$ د) بعد از بتوان رساندن هم $\mathbb{R} = \mathbb{R} \rightarrow$ بعد از بتوان رساندن هم $\mathbb{R}$ است.	9
الف) $2x(-2) \neq x \rightarrow$ متغیرانیک است $\Rightarrow R_f = \mathbb{R} - \left\{ \frac{3}{2} \right\}$ ب) $2x \neq x \rightarrow$ متغیرانیک است $\rightarrow R_g = \mathbb{R} - \{2\}$	10