

$$2x^2 + y^2 - 4x + 4y + K = 0 \Rightarrow 2x^2 - 4x + 2 + y^2 + 4y + 4 = 0 \quad \leftarrow ①$$

$$\Rightarrow K = 11$$

$$a^2 + Ka = 2(a+a+1) \Rightarrow a^2 + a - 2 = 0 \Rightarrow a+b+c=0 \quad ②$$

$$\rightarrow a = -2, a = 1 \xrightarrow{a>0} a = 1 \Rightarrow f(1) = 2 \times 1 + 1 + 2 = 5$$

$$|x+1| > 2 \Rightarrow x+1 > 2 \Rightarrow x > 1, x+1 < -2 \Rightarrow x < -3$$

$$\xrightarrow{x=-3} 11 - b = a - 4 \Rightarrow a + b = 15$$

$$4x - a > 0 \Rightarrow x > \frac{a}{4}, b - 3x > 0 \Rightarrow 3x < b \Rightarrow x < \frac{b}{3}$$

$$\frac{a}{4} < x < \frac{b}{3} \xrightarrow{x=2} \frac{a}{4} < 2 < \frac{b}{3} \Rightarrow a = 12, b = 4 \Rightarrow \frac{b}{a} = \frac{1}{3}$$

$$x = -1 \quad x = 4$$

$$الف) y = \sqrt{\frac{x+1}{|x-1|}} + \sqrt{\frac{4-x}{x^2+2x+4}} \Rightarrow$$

$$\xrightarrow{x=3} \frac{-1}{-4} + \frac{1}{0} + \frac{1}{4} + \frac{1}{-} \Rightarrow D_y = [-1, 4] - \{3\}$$

$$y = \sqrt{[x]-4} + \sqrt{2-[x]} \Rightarrow [x]-4 \geq 0 \Rightarrow [x] \geq 4 \Rightarrow [4, +\infty) \quad ①$$

$$2-[x] \geq 0 \Rightarrow [x] \leq 2 \Rightarrow (-\infty, 3) \quad ② \Rightarrow \emptyset \cap \emptyset = D_y = \emptyset$$

$$الف) y = \sqrt{\frac{x^2-x-4}{x^2-13x^2+39}} \quad (x-3)(x+2) + 3 = -2$$

$$x^2 = t \Rightarrow t^2 - 13t + 39 = 0 \Rightarrow (t-4)(t-9) \quad t = \pm 4$$

$$\xrightarrow{x^2=4} x = \pm 2 \quad \xrightarrow{x^2=9} x = \pm 3$$

$$\Rightarrow D_y = (-\infty, -3) \cup (2, +\infty) - \{3\}$$

⑦

الف) $y = \sqrt{1 - \log_{\frac{1}{2}} x - 1} \Rightarrow 1 - \log_{\frac{1}{2}} x \geq 0 \Rightarrow \log_{\frac{1}{2}} x \leq 1 \Rightarrow x - 1 \geq \frac{1}{2}$
 $x - 1 > 0 \Rightarrow x > 1$
 $\Rightarrow x \geq \frac{3}{2} \Rightarrow Dy: \emptyset \cap \emptyset = [\frac{3}{2}, +\infty)$
 چون پایه لگاریتم برابر 1 نیست حتماً معنی ندارد

ب) $y = \sqrt{\frac{x^2 - x}{1 - \log_{\frac{1}{2}} x - 3x}} \rightarrow x = 0, x = 1$
 $1 \neq \log_{\frac{1}{2}} x \Rightarrow x^2 - 3x \neq 1 \Rightarrow x^2 - 3x - 1 \neq 0 \rightarrow a + c = b \rightarrow x \neq -1, x \neq 4, x^2 - 3x > 0 \Rightarrow$
 $x(x - 3) > 0 \rightarrow \begin{array}{ccc} 0 & 3 & 0 \\ + & - & + \end{array}, \begin{array}{ccc} 0 & 1 & 0 \\ + & - & + \end{array} \Rightarrow Dy = (-\infty, 0) \cup (3, +\infty) - \{-1, 4\}$

⑧

الف) $y = \sqrt{2^{3x} - x^2} - 1 \rightarrow 2^{3x} - x^2 \geq 2^0 \Rightarrow x^2 + 4x - 3 \geq 0 \rightarrow a + b + c = 0$
 $\rightarrow x = -3, x = 1 \Rightarrow \begin{array}{cc} -3 & 1 \\ - & + \end{array} \Rightarrow Dy = [-3, 1]$

ب) $y = \left(\frac{3x + a}{2x + 1}\right)!$ $\rightarrow y = \frac{ax + b}{cx + d} \Rightarrow x = \frac{-cy + b}{ay - a}$
 $ey = a$

$\Rightarrow Dy = \{x \mid x = \frac{-3k + a}{2k - 1}, k \in \mathbb{N}\}$

ب) $y = \sqrt{\frac{x^3 - 2x^2 - 5x + 4}{x^4 + 2x^2 - 5x - 4}} \rightarrow 1 - 2 - 5 + 4 = 0 \rightarrow$ براساس $x=1$ ②
 $\frac{x^3 - 2x^2 - 5x + 4}{x^4 + 2x^2 - 5x - 4} \rightarrow 1 - 5 = -4 + 2 \rightarrow$ براساس $x=3$

$x^3 - 2x^2 - 5x + 4 \mid x-1 \rightarrow x=1, x=3, x=-2$
 $-x^3 + x^2$
 $x^2 - x + 4$

$-x^2 - 5x + 4$
 $+x^2 = -4$

$-4x + 4$
 $+4x - 4$
 0

$-3 \quad -2 \quad -1 \quad 1 \quad 2 \quad 3$

$\frac{0}{+} - \frac{0}{+} + \frac{0}{+} - \frac{0}{+} + \frac{0}{+} - \frac{0}{+} + \rightarrow Dy = (-\infty, -3) \cup (-2, -1) \cup [1, +2) \cup [3, +\infty)$

الف) $y = \sqrt{[x] - 2} \rightarrow [-x] \geq 2 \Rightarrow Dy = (-\infty, -2]$ ③

ب) $y = \frac{5x^2 + 4}{[x]^2 - 2[x] - 4} \Rightarrow [x] = t \Rightarrow t^2 - 2t - 4 \Rightarrow a+c=b$

$t = +3, c = -1 \Rightarrow$

$[x] = 3 \Rightarrow [3, 4)^{\oplus}, [x] = -1 \Rightarrow [-1, 0)^{\oplus} \Rightarrow Dy = \emptyset \cup \emptyset \Rightarrow$
 $Dy = \mathbb{R} - [-1, 0) \cup [3, 4)$ ④

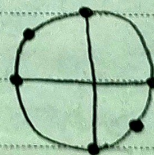
الف) $y = \frac{\cot x + 1}{\tan x + 1} \Rightarrow y = \frac{\cos x + \sin x}{\sin x}$
 $\frac{\sin x + \cos x}{\cos x}$

$\sin x \neq 0$

$\sin x + \cos x \neq 0$

$\sin x \neq -\cos x$

$\cos x \neq 0 \Rightarrow$



$\Rightarrow Dy = \mathbb{R} - \left\{k\pi + \frac{3\pi}{4}\right\}$

$\cup \mathbb{R} - \left\{\frac{k\pi}{2}\right\}$

ب) $y = \sqrt{1 - \frac{1}{4}\sin^2 x} \Rightarrow 1 - \frac{1}{4}\sin^2 x \geq 0 \Rightarrow \sin^2 x \leq \frac{4}{1} \Rightarrow$

$\sin x \geq -\frac{1}{2}, \sin x \leq \frac{1}{2} \rightarrow$

$Dy = \left[\frac{3\pi}{4}, \frac{5\pi}{4}\right] \cup \left[\frac{11\pi}{4}, \frac{13\pi}{4}\right]$

