

$$2x^2 - 4x + y^2 + 4y + k = 0$$

$$2(x-1)^2 + (y+2)^2 \rightarrow 2x^2 - 4x + \frac{2}{k} + y^2 + 4y + \frac{4}{k} \Rightarrow k = 4 + 2 = 11$$

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$$x=a \Rightarrow a^2 + 4a = 2a + a + 2, a^2 + a - 2 = 0, \Delta = 1 + 8 = 9 \Rightarrow a = \frac{-1 \pm 3}{2} \Rightarrow a = 1, -2$$

و $a > 0 \Rightarrow a = 1$

$$f(x) = \begin{cases} x^2 + 4x; & x \geq 1 \\ 2x + a + 2; & x \leq 1 \end{cases} \rightarrow f(1) = (1)^2 + 4(1) = 5$$

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$$|x+1| \geq 2 \rightarrow x+1 \geq 2, x \geq 1 / x+1 \leq -2, x \leq -3$$

و مشترک در $x \leq -3$

$$\begin{cases} 2(-3)^2 - b = 11 - b \\ a + 2(-3) = a - 6 \end{cases} \Rightarrow \begin{cases} 11 - b = a - 4 \\ a + b \leq 11 + 2 = 13 \end{cases}$$

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$$y = \sqrt{4x-a} + \sqrt{b-3x} \xrightarrow{x=2} \sqrt{12-a} + \sqrt{b-6} = y$$

$$\begin{cases} 12-a \geq 0, a \leq 12 \\ b-6 \geq 0, b \geq 6 \end{cases} \Rightarrow \frac{b}{a} = \frac{4}{12} = \frac{1}{3}$$

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$$\frac{x+1}{|x-3|} > 0, x = -1, 3 \quad \frac{x-1}{-1+3} \rightarrow [-1, +\infty) - \{3\}$$

$$\frac{4-x}{x^2+2x+2} \geq 0 \rightarrow \text{همواره مثبت}$$

$$4 \geq x \rightarrow \frac{x-1}{1+1} \rightarrow (-\infty, 4]$$

$$\Rightarrow \mathbb{R} \cap \mathbb{R} = [1, 4] - \{3\}$$

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$$\neg) [x] \geq 0, [x] \geq 4 \rightarrow [4, +\infty) \cap \mathbb{Q}$$

$$\Rightarrow \mathbb{Q} \cap \mathbb{Q} = \emptyset$$

$$2 - [x] \geq 0, [x] \leq 2 \rightarrow (-\infty, 2) \cap \mathbb{Q}$$

الف) $x^2 - x - 4 > 0 \rightarrow x \in \mathbb{R}, -2$ $x^2 - 13x + 42 > 0$ $x^2 = a \rightarrow a^2 - 13a + 42, \Delta = 149 - 168 = -19, a = \frac{13 \pm \sqrt{19}}{2}, x = 9, f \Rightarrow x = -2, 9, -2, 9$ ب) $x^2 - 2x - 2x + 4 \div (x-1) \rightarrow x^2 - x - 4 \Rightarrow (x-1)(x-4)(x+2) \Rightarrow x = 1, 4, -2$ $x^2 - 2x - 2x - 4 \div (x+1) \rightarrow x^2 + x - 4 \Rightarrow (x+1)(x+2)(x-2) \Rightarrow x = -1, 2, -2$ $D_f = (-\infty, -2) \cup (-2, 1) \cup (1, 2) \cup (2, +\infty)$	$x \mid \begin{array}{c} -2 \quad -1 \quad 1 \quad 2 \\ + \quad - \quad + \quad - \end{array}$ $D_f = (-\infty, -2) \cup (2, +\infty)$	
الف) $[-x] - 2 > 0, [-x] \geq 2 \Rightarrow D_f = [-\infty, -2]$ ب) $\frac{\omega x^2 + 4}{[x]^2 - 2[x] - 3} \geq 0$ ^{هنا} $\Delta = f + 12 = 14, [x] = \frac{y \pm f}{2} \Rightarrow [x] \leq 2, -1$ $x \neq [2, f), x \neq [-1, 0) \Rightarrow \textcircled{1} \cup \textcircled{2} \subseteq D_f = \mathbb{R} - \{[2, f), [-1, 0)\}$		Y
الف) $\cot x + 1 \rightarrow \frac{\cos x}{\sin x}, \sin x \neq 0 \Rightarrow x \neq K\pi$ $\tan x + 1 \rightarrow \textcircled{1} \cup \textcircled{2} \Rightarrow D_f \subseteq \mathbb{R} - \{K\pi, K\pi + \frac{\pi}{2}, K\pi + \frac{3\pi}{2}\}$ $\tan x \neq -1 \Rightarrow x \neq \{K\pi + \frac{3\pi}{4}, K\pi + \frac{7\pi}{4}\}$ ب) $1 - \sin^2 x \geq 0, \sin^2 x \leq 1, \sin^2 x \leq \frac{1}{4}, -\frac{1}{2} \leq \sin x \leq \frac{1}{2}$ $D_f = \{K\pi, K\pi + \frac{\pi}{4}, K\pi - \frac{\pi}{4}\}$		A
الف) $1 - \log_{\frac{1}{4}} x^{-1} > 0 \rightarrow \log_{\frac{1}{4}} x^{-1} < 1 \rightarrow x^{-1} < \frac{1}{4}, x < \frac{4}{x} \rightarrow D_f = (-\infty, \frac{4}{x}]$ ب) $x^2 - x \geq 0, x(x-1) \geq 0, x = 1, 0$ $\frac{0}{+ \quad - \quad +} \textcircled{1} (-\infty, 0] \cup [1, +\infty)$ $1 - \log_{\frac{1}{4}} x^2 \neq 0 \rightarrow \log_{\frac{1}{4}} x^2 \neq 1, x^2 - 2x \neq 4, \Delta = 4, x = \frac{2 \pm 2}{2} \Rightarrow x \neq f, -1 \textcircled{2}$ $\textcircled{1} \cap \textcircled{2} = (-\infty, 0] \cup [1, +\infty) - \{-1, f\}$		9
الف) $\sqrt{x-x^2} - 1 > 0, \sqrt{x-x^2} > 1 \Rightarrow \sqrt{x-x^2} > 1, \sqrt{x-x^2} > 1 \Rightarrow \Delta = 4, x = 1, 3$ $x \mid \begin{array}{c} 1 \quad 3 \\ + \quad - \end{array} \rightarrow D_f = [1, 3]$ ب) $\frac{wx + \omega}{x + f} \in W \rightarrow wx + \omega = xW + fW \rightarrow wx - xW = fW - \omega, x(w - W) = fW - \omega$ $x = \frac{fW - \omega}{w - W} \rightarrow \{x \mid x = \frac{fK - \omega}{w - WK}, K \in W\}$		1.