

$$\frac{2(x-1)^2}{\downarrow} + \frac{(y+3)^2}{\downarrow} = 0$$

$$2x^2 - 4x + 2 + y^2 + 6y + 9 = 0 \rightarrow K = 9 + 2 = 11 \quad \text{جواب}$$

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$$\begin{aligned} x^2 + fx &\xrightarrow{x=a} a^2 + fa \\ 2x + a + 2 &\xrightarrow{x=a} 2a + a + 2 \end{aligned} \rightarrow a^2 + fa = 3a + 2 \rightarrow a^2 + a - 2 = 0$$

$$\Delta = 1 - 4(-2) = 9 \rightarrow a = \frac{-1 \pm 3}{2}$$

$$\rightarrow a = 1, -2 \quad (a > 0) \rightarrow a = 1$$

$$f(x) = \begin{cases} x^2 + fx & ; x \geq 1 \\ 2x + 2 & ; x < 1 \end{cases} \rightarrow f(1) = 2(1) + 2 = 4 \quad \text{جواب}$$

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$$|x+1| \geq 2 \rightarrow x+1 \geq 2 \Rightarrow x \geq 1$$

$$\rightarrow x+1 \leq -2 \Rightarrow x \leq -3$$

$$\begin{aligned} x^2 + fx &\xrightarrow{x=-2} 2(9) - b = 18 - b \\ a + 2x &\xrightarrow{x=-2} a - 4 \end{aligned} \rightarrow 18 - b = a - 4 \rightarrow a + b = 22 \quad \text{جواب}$$

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$$\sqrt{4x-a} + \sqrt{b-3x} = 4$$

$$4x-a \geq 0 \rightarrow 4x \geq a \rightarrow x \geq \frac{a}{4} \xrightarrow{x=2} 2 \geq \frac{a}{4}$$

$$b-3x \geq 0 \rightarrow 3x \leq b \rightarrow x \leq \frac{b}{3} \xrightarrow{x=2} 2 \leq \frac{b}{3}$$

$$\rightarrow \frac{a}{4} = \frac{b}{3} = 2 \rightarrow b = 6, a = 8 \rightarrow \frac{b}{a} = \frac{6}{8} = \frac{3}{4} = \left(\frac{1}{2}\right)$$

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$$\sqrt{\frac{x+1}{1-x-1}} \xrightarrow{x=1} \frac{-1+3}{2} \rightarrow (3, \infty) \cup [1, 3) \quad ①$$

$$\sqrt{\frac{4-x}{x^2+2x+5}} \xrightarrow{x=4} \frac{4}{16+8+5} = \frac{4}{29} \rightarrow (-\infty, 4) \quad ②$$

$$① \cap ② \Rightarrow D = [-1, 4] - \{3\}$$

(الف)

$$[x] - f \geq 0 \rightarrow [x] \geq f \rightarrow x \geq f \quad ①$$

$$f - [x] \geq 0 \rightarrow [x] \leq f \rightarrow x < f+1 \quad ②$$

$$① \cap ② = \emptyset$$

(ب)

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(الف) $x^2 - x - 4 \rightarrow \Delta = 17 \rightarrow x = \frac{1 \pm \sqrt{17}}{2}$
 $x^2 - 17x^2 + 4 \rightarrow x^2 = b \rightarrow b^2 - 17b + 4 \rightarrow \Delta = 17 \rightarrow b = \frac{17 \pm \sqrt{17}}{2} \rightarrow 9 \rightarrow x = \pm 3$
 $\frac{1}{3} - \frac{1}{3} - \frac{1}{3} + \frac{1}{3} \rightarrow D = (-\infty, 0) \cup (1, 4) \cup (17, +\infty)$

(ب) $x^2 - 17x^2 - 2x + 4 \div (x-1) = (x-1)(x+2) \rightarrow x = 1, -2$
 $x^2 + 17x^2 - 2x - 4 \div (x+1) = (x+1)(x-2) \rightarrow x = -1, 2$
 $\frac{1}{3} - \frac{1}{3} - \frac{1}{3} + \frac{1}{3} \rightarrow D = (-\infty, -1) \cup [-1, 1] \cup [2, +\infty)$

(الف) $[-x] - 2 \geq 0 \rightarrow [-x] \geq 2 \rightarrow -x \geq 2 \rightarrow x \leq -2 \rightarrow D = (-\infty, -2]$

(ب) $[x]^2 - 2[x] - 3 \neq 0 \rightarrow \Delta = 4 - 4(-3) = 16 \rightarrow [x] = \frac{2 \pm 4}{2} \rightarrow [x] = 3, -1$
 $[x] \neq 0 \rightarrow x \notin [0, 1)$
 $[x] \neq -1 \rightarrow x \notin [-1, 0)$
 $D = \mathbb{R} - \{[0, 1) \cup [-1, 0)\}$

(الف) $\frac{\cos x}{\sin x} + 1 \rightarrow \tan x \neq 0 \rightarrow x \notin k\pi$ (1)
 $\tan x + 1 \neq 0 \rightarrow \tan x \neq -1 \rightarrow x \notin \{k\pi + \frac{3\pi}{4}, k\pi + \frac{7\pi}{4}\}$ (2)
 $D = (1) \cup (2) \rightarrow \mathbb{R} - \{k\pi, k\pi + \frac{3\pi}{4}, k\pi + \frac{7\pi}{4}\}$

(ب) $1 - \sin^2 x \geq 0 \rightarrow \sin^2 x \leq 1 \rightarrow \sin^2 x \leq \frac{1}{4} \rightarrow \sin x \leq \frac{1}{2} \rightarrow -\frac{1}{2} \leq \sin x \leq \frac{1}{2} \rightarrow x \in [k\pi, k\pi + \frac{\pi}{2}]$
 $\rightarrow D = \{ \frac{k\pi}{2} + \frac{\pi}{4}, k\pi \}$

(الف) $1 - \log_{\frac{1}{2}} x \geq 0 \rightarrow \log_{\frac{1}{2}} x \leq 1 \rightarrow x - 1 \leq \frac{1}{2} \rightarrow x \leq \frac{3}{2} \rightarrow D = (-\infty, \frac{3}{2}]$

(ب) $x^2 - x \geq 0 \rightarrow x \geq 0 \rightarrow \frac{1}{x+1} \rightarrow (-\infty, 0] \cup [1, +\infty)$ (1)
 $1 - \log_{\frac{1}{2}} x \neq 0 \rightarrow \log_{\frac{1}{2}} x \neq 1 \rightarrow x^2 - 17x^2 + 4 \rightarrow x^2 - 17x^2 - 4 \neq 0 \rightarrow \Delta = 17 \rightarrow x = \frac{17 \pm \sqrt{17}}{2} \rightarrow \frac{1}{x+1} \rightarrow \mathbb{R} - \{ -1, \frac{17 \pm \sqrt{17}}{2} \}$ (2)
 $(1) \cap (2) = (-\infty, 0] \cup [1, +\infty) - \{ -1, \frac{17 \pm \sqrt{17}}{2} \}$

(الف) $17^x - x^2 \geq 0 \rightarrow 17^x \geq x^2 \rightarrow x \geq 0 \rightarrow x^2 - 17x^2 \geq 0 \rightarrow -x^2 + 17x^2 \geq 0 \rightarrow x \geq 0$
 $\frac{1}{1+1} \rightarrow [1, 17] = D$

(ب) $\frac{17x+1}{x+1} \in \mathbb{W} \rightarrow 17x+1 \in \mathbb{W} \rightarrow 17x+1 = k \rightarrow 17x = k-1 \rightarrow x = \frac{k-1}{17} \rightarrow x \in \{ \frac{k-1}{17}, k \in \mathbb{W} \}$