

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

$$(\sqrt{2}x - 2)^2 + (y + 1)^2 = 0$$

$$\hookrightarrow z = \sqrt{2}t + 1$$

$$k = z^2 + t^2 = 4 + 9 = 13$$

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$$x = a \Rightarrow a^2 + 4a = 3a + 2 \rightarrow a^2 + a - 2 = 0$$

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

$$a > 0 \rightarrow a = 1$$

$$f(1) = (1)^2 + f(1) = 0$$

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

$$x = -3 \Rightarrow 18 - b = a - 4$$

$$\hookrightarrow a + b = 22$$

(جواب سؤالات ۵ و ۶)

را جانب جا نوشتن

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$$4x - a > 0 \rightarrow 4x > a \rightarrow x > \frac{a}{4} \quad (1)$$

$$b - 3x > 0 \rightarrow 3x < b \rightarrow x < \frac{b}{3} \quad (2)$$

$$(1) \cup (2) \rightarrow \frac{b}{3} > x > \frac{a}{4} \Rightarrow \frac{a}{4}, \frac{b}{3} = 2 \rightarrow a = 12, b = 4$$

$$\frac{b}{a} = \frac{1}{3}$$

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$$\text{الف)} \quad \frac{x^2 - x - 4}{x^2 - 13x + 24} > 0 \quad x^2 - x - 4 = 0 \quad x = 3.7, -1.7$$

$$(x - 3.7)(x + 1.7) = 0$$

$$x = t \rightarrow t^2 - 13t + 24 = 0 \rightarrow (t - 8)(t - 9) = 0$$

$$t = 8, 9 \rightarrow x = \pm 2, \pm 3$$

x	-3	-2	2	3
	+	-	-	+

$x \in (-\infty, -3) \cup (2, 3) \cup (3, +\infty)$

$$\frac{x^2 - 2x^2 - 5x + 4}{x^2 + 2x^2 - 5x - 4} > 0 \quad \frac{-x^2 + 2x^2 - 5x + 4}{x^2 + 2x^2 - 5x - 4} \cdot \frac{x+1}{x+1}$$

$$\frac{x^2 - 2x^2 - 5x + 4}{x^2 + 2x^2 - 5x - 4} \cdot \frac{x+1}{x+1} = \frac{(x-1)(x-4)}{(x+1)(x+4)}$$

$$\frac{x^2 - 2x^2 - 5x + 4}{x^2 + 2x^2 - 5x - 4} = \frac{(x-1)(x-4)}{(x+1)(x+4)}$$

x	-3	-2	-1	1	2	3
	+	-	+	-	+	-

$x \in [3, +\infty) \cup [-2, -1) \cup (-\infty, -3) \cup (1, 2)$

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الف) $\frac{x+1}{1-x} > 0 \rightarrow x+1 > 0 \rightarrow x > -1$ ① $x-3 \neq 0 \rightarrow x \neq 3$ ② $\frac{4-x}{x^2+x+1} > 0 \quad 4-x > 0 \rightarrow x < 4$ ③ $\hookrightarrow 0 < x < 4 \rightarrow$ مكافئ ① $\cup$ ② $\cup$ ③ $\rightarrow x \in [-1, 4] - \{3\}$	ب) $[x]-4 > 0 \rightarrow [x] > 4$ $\rightarrow x > 4$ ① $2-[x] > 0 \rightarrow [x] < 2$ $\rightarrow x < 2$ ② ① $\cup$ ② $\rightarrow x \in \emptyset$	6
الف) $[-x]-2 > 0 \rightarrow [-x] > 2$ $-x > 2 \rightarrow x < -2$	ب) $[x]=1 \rightarrow 1^2-4+3 \neq 0$ $(t-3)(t+1) \neq 0 \rightarrow t \neq 3, -1$ $[x] \neq 3 \rightarrow x \neq [3, 4)$ ① $[x] \neq -1 \rightarrow x \neq [-1, 0)$ ② ① $\cup$ ② $\rightarrow x \in \mathbb{R} - [3, 4) \cup [-1, 0)$	7
$\cot x = \frac{\cos x}{\sin x} \rightarrow \sin x \neq 0$ (الف) $\tan x = \frac{\sin x}{\cos x} \rightarrow \cos x \neq 0$ $\tan x + 1 \neq 0 \rightarrow \tan x \neq -1$ $x \in \mathbb{R} - \{k\pi, k\pi + \frac{\pi}{4}, k\pi + \frac{3\pi}{4}\}$	ب) $1 - \sin^2 x > 0 \rightarrow \sin^2 x < 1$ $\rightarrow \sin^2 x < \frac{1}{4} \rightarrow -\frac{1}{2} < \sin x < \frac{1}{2}$ $x \in [k\pi - \frac{\pi}{4}, k\pi + \frac{\pi}{4}]$	8
الف) $\log_{\frac{x-1}{4}} \rightarrow x-1 > 0 \rightarrow x > 1$ ① $1 - \log_{\frac{x-1}{4}} > 0 \rightarrow \log_{\frac{x-1}{4}} < 1$ $\rightarrow x-1 > \frac{1}{4} \rightarrow x > \frac{5}{4}$ ② ① $\cup$ ② $\rightarrow x \in [\frac{5}{4}, +\infty)$	ب) $x^2-x > 0 \rightarrow x(x-1) > 0$ $\frac{x}{1+\frac{1}{x}-\frac{1}{x}} \quad x \in (-\infty, 0] \cup [1, +\infty)$ ① $\log_{\frac{x^2-3x}{4}} \quad x^2-3x > 0 \quad \frac{x}{1+\frac{1}{x}-\frac{1}{x}} \quad x \in (-\infty, 0) \cup (3, +\infty)$ ② $\log_{\frac{x^2-3x}{4}} \neq 1 \rightarrow x^2-3x \neq 4 \rightarrow x^2-3x-4 \neq 0$ $\rightarrow x \neq 4, -1$ ③ ① $\cup$ ② $\cup$ ③ $\rightarrow x \in (-\infty, 0) \cup (3, +\infty) - \{4, -1\}$	9
الف) $2^{fx-x^2} - 8 > 0$ $2^{fx-x^2} > 8 \rightarrow \log_2 \wedge < fx-x^2$ $3 < fx-x^2 \rightarrow -x^2+fx-3 > 0$ $\frac{x}{1-\frac{1}{x}+\frac{1}{x}} \quad x \in [1, 3]$	ب) $\frac{rx+w}{rx+r} \in \mathbb{W} \rightarrow x \in -\frac{rw-w}{rw-r}$ $\Rightarrow \{x \mid x = \frac{w-rk}{rk-r}, k \in \mathbb{W}\}$	10