

$\begin{aligned} 2x^2 - 4x + y^2 + 4y + k &= 0 \\ 2x^2 - 4x + k_1 + y^2 - 4y + k_2 &= 0 \\ x^2 - 2x + \frac{1}{2}k_1 &= 0 & y^2 + 4y + k_2 &= 0 \\ (x-1)(x-k_1) &= 0 & (y+2)(y+k_2) &= 0 \\ -1-k_1 &= -4 & 2+k_2 &= 0 \\ k_1 &= 3 & k_2 &= -2 \end{aligned}$	$\begin{aligned} 2(x-1)^2 - 2 + 4(y+2)^2 - 4 + k &= 0 \\ k &= 11 \end{aligned}$	۱
$\begin{aligned} x^2 + 4x &; x \geq a \quad I \\ 2x + 4 &; x \leq a \quad II \\ (a)^2 + 4(a) &= 2(a) + 4 \\ a^2 + 4a &= 2a + 4 \\ a^2 + 2a - 4 &= 0 \\ (a+2)(a-2) &= 0 \\ a &= -2, 2 \end{aligned}$	$\begin{aligned} x^2 + 4x &; x \geq 1 \\ 2x + 4 &; x \leq 1 \\ I \cap II : x &= 1 \\ a &= -2, 1 \} a = 1 \\ a &> 0 \text{ مفروضه} \\ f(1) &= (1)^2 + 4(1) = 2(1) + 4 = 6 \end{aligned}$ $f(1) = 6$	۲
$\begin{aligned} 2x^2 - b &; x+1 \geq 2 \\ a + 12 &; -2 \leq x \leq -1 \quad II \\ x+1 &\geq 2 \\ x+1 &\geq 2 \Rightarrow x \geq 1 \\ x+1 &\leq -2 \Rightarrow x \leq -3 \end{aligned}$	$\begin{aligned} I \cap II \Rightarrow x &= -3 \\ 2(-3)^2 - b &= a + 2(-3) \\ 18 - b &= a - 6 \\ a + b &= 24 \end{aligned}$	۳
$\begin{aligned} 4x - a &\geq 0 \quad I \\ b - 2x &\geq 0 \quad II \\ x &\geq \frac{a}{4} \\ x &\leq \frac{b}{2} \end{aligned}$	$\begin{aligned} I \cap II &= \{2\} \\ a &\leq 12 \\ b &\geq 4 \\ 12 - a &= 0 \Rightarrow a = 12 \\ b - 4 &= 0 \Rightarrow b = 4 \end{aligned}$ $\frac{b}{a} = \frac{4}{12} = \frac{1}{3}$	۴
$\begin{aligned} \frac{x+1}{ x-2 } &\geq 0 \\ \frac{4-x}{x^2+2x+4} &\geq 0 \end{aligned}$	$\begin{aligned} I &= [-1, +\infty) - \{2\} \\ II &= (-\infty, 4] \\ I \cap II &= [-1, 4] - \{2\} \\ Df &= [-1, 4] - \{2\} \end{aligned}$	۵

$$y = \sqrt{\frac{x^2 - x - 4}{x^2 - 13x + 44}} \Rightarrow \frac{(x-4)(x-1)}{(x-4)(x-11)} \geq 0$$

$$\frac{-4}{+} \frac{-1}{-} \frac{1}{-} \frac{11}{+}$$

$$Df = (-\infty, -4) \cup (1, 11) \cup (11, +\infty)$$

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$$\frac{x^2 - 13x + 44}{x^2 - x - 4} \geq 0 \quad \frac{x-1}{x^2 - x - 4}$$

$$\frac{x^2 - 13x + 44}{x^2 - x - 4} \geq 0 \quad \frac{(x-1)(x-4)(x+11)}{(x+1)(x+4)(x-4)} \geq 0$$

$$\frac{(x-1)(x-4)(x+11)}{(x+1)(x+4)(x-4)} \geq 0$$

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$$\frac{-x^2 - 4x}{x^2 - x - 4}$$

$$Df = (-\infty, -4) \cup (-2, -1) \cup [1, 4) \cup [11, +\infty)$$

$$\frac{-4}{+} \frac{-2}{-} \frac{-1}{-} \frac{1}{+} \frac{4}{-} \frac{11}{+}$$

$$\sqrt{[x] - 1} \quad \begin{cases} [x] - 1 \geq 0 \\ [x] \geq 1 \end{cases} \Rightarrow x \leq -1 \quad Df = (-\infty, -1]$$

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$$Df: \Delta x \neq 0 \Rightarrow Df = \mathbb{R}$$

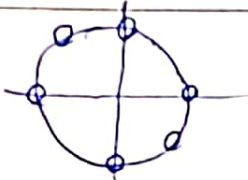
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$$[x] - 1 \geq 0 \Rightarrow (x-1)(x+1) \geq 0$$

$$\frac{-1}{+} \frac{0}{-} \frac{1}{-} \frac{1}{+}$$

$$Df: (-\infty, -1) \cup [0, 1) \cup [4, +\infty)$$

$$\sin \neq 0 \quad \tan \neq 1 \neq 0$$



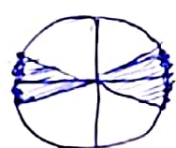
$$Df = \mathbb{R} - \left\{ \frac{k\pi}{2}, k\pi - \frac{\pi}{4} \right\}$$

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$$(1 - \gamma \sin x)(1 + \gamma \sin x) \geq 0$$

$$\frac{-1}{-} \frac{1}{+}$$



$$Df = \left[k\pi - \frac{\pi}{4}, k\pi + \frac{\pi}{4} \right]$$

(ب)

$$I: x-1 > 0 \quad II: 1 - \log \frac{x-1}{x} \geq 0 \quad \left. \begin{array}{l} \log \frac{x-1}{x} = -\log \frac{x}{x-1} \\ \log \frac{x}{x-1} \geq -1 \end{array} \right\} \Rightarrow x-1 \geq \frac{1}{x} \Rightarrow x \geq \frac{x}{x-1}$$

$$I \cap II \Rightarrow Df = x \geq \frac{x}{x-1} \Rightarrow \left[\frac{x}{x-1}, +\infty \right)$$

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$$I: x^2 - x \geq 0 \quad R = (0, 1)$$

$$II: x^2 - 2x > 0 \quad x(x-2) > 0 \quad R = [2, +\infty)$$

$$III: 1 - \log \frac{x^2 - 2x}{x} \neq 0 \Rightarrow \log \frac{x^2 - 2x}{x} \neq 0 \Rightarrow x^2 - 2x \neq x^2 \Rightarrow Df = (-\infty, 0) \cup (2, +\infty) - \{ -1, 4 \}$$

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$$\frac{x^2 - 2x}{x} - 1 \geq 0 \quad \frac{x^2 - 2x - x}{x} \geq 0 \quad \frac{x^2 - 3x}{x} \geq 0 \quad (x-1)(x-3) \leq 0$$

$$x^2 - 2x \geq x$$

$$\frac{1}{+} \frac{-3}{-} \frac{3}{+}$$

$$Df = [1, 3]$$

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$$\frac{a+b}{c+d} = \frac{1}{2} \Rightarrow x = -\frac{(d+b)}{c-a}$$

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$$x = -\frac{c+d}{c-a} = \frac{d-c}{c-a} \Rightarrow Df = \left\{ x \mid x = \frac{d-c}{c-a}, k \in \mathbb{N} \right\}$$