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$$x^2 + y^2 - 4x + 4y + k = 0 \begin{cases} x^2 + y^2 + ① \rightarrow (y+2)^2 & ① = 4 \\ x^2 - 4x + ② \rightarrow x^2 - 4x + 4 \rightarrow (x-2)^2 & ② = 4 \end{cases}$$

$k = ① + ② = 4 + 4 = 8$

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جمله نرسي

$$f(1) = (1)^2 + f(1) = 5$$

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$$\begin{aligned} x+1 &\geq 2 & x &\geq 1 \\ x+1 &\leq -2 & x &\leq -3 \end{aligned}$$

$$x(-3)^2 - b = a + x(-3) \rightarrow a + b = 12$$

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$$\begin{aligned} 12a &\geq 0 & 12 &\geq a \\ b-4 &\geq 0 & b &\geq 4 \end{aligned}$$

$$\frac{b}{a} = \frac{1}{2}$$

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قدر مطلق

$$\frac{x+1}{|x-3|} \geq 0 \quad \begin{aligned} x &= -1 & \frac{-1+1}{|-1-3|} = 0 \\ x &= 3 & \frac{3+1}{|3-3|} = \text{undefined} \end{aligned} \quad (-\infty, -1] \cup (3, +\infty)$$

$$\frac{4-x}{x^2+x+4} \geq 0 \quad \begin{aligned} x &= 4 & \frac{4-4}{4^2+4+4} = 0 \\ & \rightarrow x \leq -4 \end{aligned} \quad (-\infty, 4]$$

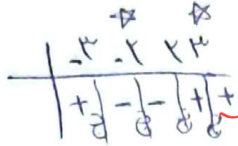
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$$\begin{aligned} [x] - 4 &\geq 0 & [x] &\geq 4 & [x] &\in (4, +\infty) & ① \\ 2 - [x] &\geq 0 & 2 &\geq [x] & [x] &\in (-\infty, 2) & ② \end{aligned}$$

$$① \cap ② = \emptyset$$

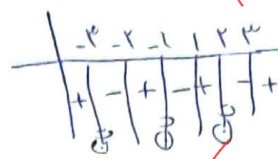
$$① \cap ② = (-\infty, -1] \cup (3, 4] \quad \{2, [-1, 4] - \{4\}\}$$

$\frac{x^2-x-4}{x^2-1} > 0 \Rightarrow (x-2)(x+2) > 0$   
 $\frac{x^2-1}{x^2-1} = 0 \Rightarrow x = \pm 2$



$\mathbb{R} = (-\infty, -2) \cup (-2, 2) \cup (2, +\infty)$

$\frac{x^2-1}{x^2-1} > 0 \Rightarrow (x-1)(x+1) > 0$   
 $\frac{x^2-1}{x^2-1} = 0 \Rightarrow x = \pm 1$



$(-\infty, -1) \cup (-1, 1) \cup (1, +\infty)$

$[x] = 2 \Rightarrow x \in [2, 3)$   
 $[x] = 1 \Rightarrow x \in [1, 2)$

$[x]^2 - 1[x] - 2 \neq 0$

$([x] - 2)([x] + 1) \neq 0 \Rightarrow \begin{cases} [x] = 2 \rightarrow x \in [2, 3) \\ [x] = -1 \rightarrow x \in [-1, 0) \end{cases}$

$\tan \alpha + 1 \neq \tan \alpha \neq 1$   
 $\cos \alpha \neq 0 \Rightarrow \sin \alpha \neq 0$

$\mathbb{R} \setminus \left\{ k\pi, \frac{\pi}{2}, k\pi + \frac{\pi}{2} \right\}$

$1 - \sin \alpha \geq 0 \Rightarrow \sin \alpha \leq 1$

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

$x^2 - x > 0 \Rightarrow x(x-1) > 0$   
 $\frac{x^2-1}{x^2-1} > 0 \Rightarrow (x-1)(x+1) > 0$   
 $\frac{x^2-1}{x^2-1} = 0 \Rightarrow x = \pm 1$   
 $\mathbb{R} \setminus \{-1, 1\}$

$\frac{x^2-1}{x^2-1} > 0 \Rightarrow (x-1)(x+1) > 0$   
 $\frac{x^2-1}{x^2-1} = 0 \Rightarrow x = \pm 1$   
 $\mathbb{R} = [1, 3]$

$\frac{x^2-1}{x^2-1} \in \mathbb{Q} \Rightarrow x \in \mathbb{Q}$   
 $\frac{x^2-1}{x^2-1} \in \mathbb{Q} \Rightarrow x \in \mathbb{Q}$

$\mathbb{R} = \left\{ x \mid x = \frac{f(x)}{g(x)}, k \in \mathbb{Q} \right\}$