

$$r^2 u^2 + y^2 - \epsilon u + \gamma y + k = 0$$

$$r^2(u^2 - r^2 u) + (y^2 + \gamma y) + k = 0 \rightarrow r^2(u - r)^2 + (y + \gamma)^2 = 11 - k$$

$$k = 11$$

$$f(u) = \begin{cases} u^2 + \epsilon u : u \geq a \\ ru + a + r : u \leq a \end{cases} \xrightarrow{u=a} a^2 + \epsilon a = ra + r \rightarrow a^2 + a - r \rightarrow a = r$$

نتیجه برابر است با

$$f(u) = 1 + \epsilon = 0$$

$$f(u) = \begin{cases} ru^2 - b : (u+1)r \rightarrow u \geq 1, \infty < u < -r \\ a + ru : -r \leq u \leq -1 \end{cases}$$

$$u = -r \rightarrow 1 \Rightarrow b = a - \epsilon \rightarrow a + \epsilon = r\epsilon$$

$$y = \sqrt{4u-a} + \sqrt{b-ru} \quad D = \{r\}$$

$$\begin{aligned} 4u > a &\rightarrow u > \frac{a}{4} \\ b > ru &\rightarrow \frac{b}{r} > u \end{aligned} \quad \frac{a}{4} = \frac{b}{r} \rightarrow \frac{a}{r} = \frac{b}{4} \rightarrow b = \frac{r}{4}a$$

$$\frac{b}{a} = \frac{r}{4}$$

$$f(u) = \sqrt{\frac{u+\epsilon}{u-r}} + \sqrt{\frac{r-u}{r^2+ru+\epsilon}} = \frac{u+1}{u-r} + \frac{r-u}{r^2+ru+\epsilon}$$

$$D = (-1, r)$$

$$\Rightarrow \sqrt{[u]-\epsilon} + \sqrt{r-[u]} \rightarrow [u] > \epsilon / [u] \leq r \rightarrow u \leq r$$

$$D = R - (r, \epsilon)$$

$$\sqrt{\frac{u^2 - u - 4}{x^2 - 14x + 49}} = \sqrt{\frac{(u-5)(u+1)}{(u-7)(u+7)(u-7)(u+7)}} = \frac{\sqrt{u-5} \sqrt{u+1}}{(u-7) \sqrt{u+7}}$$

$$D = \mathbb{R} - \{-7, -1\}$$

$$\sqrt{\frac{x^2 - 14x + 49}{x^2 + 14x + 49}} \Rightarrow \frac{x^2 - 14x + 49}{x^2 + 14x + 49} = \frac{(x-7)^2}{(x+7)^2} \Rightarrow \frac{x-7}{x+7} = \pm 1$$

$$D = (-\infty, -7) \cup (-1, 7) \cup (7, +\infty)$$

$$\text{ا) } y = \sqrt{u-7} \rightarrow [u] \geq 7 \rightarrow -u \leq -7 \rightarrow u \leq -7$$

$$\text{ب) } \frac{au^2 + 4}{[u]^2 - 4[u] - 4} = 0 \quad [u] = A \rightarrow Au^2 - 4A - 4 = 0 \rightarrow A = -1/4$$

$$[u] = 1 \rightarrow -1 \leq u < 1 \quad [u] = 2 \rightarrow 2 \leq u < 4$$

$$D = (-\infty, 0) \cup (1, 4)$$

$$\text{ا) } \frac{\tan u + 1}{\tan u - 1} \rightarrow \tan u \neq -1 \quad \text{Unit Circle Diagram}$$

$$D = (k\pi, k\pi - \frac{\pi}{4}) \cup (k\pi + \frac{\pi}{4}, k\pi + \pi)$$

$$\text{ب) } \sqrt{1 - \sin^2 u} \rightarrow \frac{1}{\epsilon} \geq \sin^2 u \rightarrow \frac{1}{\sqrt{\epsilon}} \geq |\sin u|$$

$$D = (k\pi + \frac{\pi}{4}, k\pi, \frac{3\pi}{4})$$

$$\text{ا) } y = \sqrt{1 - \log_{\frac{1}{4}} u - 1} \Rightarrow 1 \geq \log_{\frac{1}{4}} u - 1 \Rightarrow \frac{1}{4} \geq u - 1 \Rightarrow u \leq \frac{5}{4}$$

$$D = (-\infty, 0) \cup (1, +\infty) - \{-1, 5\}$$

$$\text{ب) } \frac{\sqrt{u^2 - u}}{1 - \log_{\frac{1}{4}} u - 1} \rightarrow 1 \neq \log_{\frac{1}{4}} u - 1 \rightarrow u^2 - u \neq \epsilon \rightarrow u \neq 1 \pm \sqrt{1 + \epsilon}$$

$$\sqrt{\frac{u^2 - u}{u^2 - 1}} \geq 1 \rightarrow u^2 - u \geq u^2 - 1 \rightarrow -u \geq -1 \rightarrow u \leq 1$$

$$D = [1, \infty)$$

$$\text{ب) } \left(\frac{u + \omega}{u + \epsilon} \right) < \frac{u + \omega}{u + \epsilon} = u \Rightarrow u = \frac{\omega - \epsilon}{\omega - u}$$

$$D = \{u \mid u = \frac{\omega - \epsilon}{\omega - u}, \epsilon \in \mathbb{Q}\}$$