

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

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

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

$$k = 4 + 2 = 6$$

$$f(x) = \begin{cases} x^2 + 4x & ; x > a \\ 2x + 4 & ; x \leq a \end{cases}$$

$$a^2 + 4a = 2a + 4$$

$$a^2 + 2a - 4 = 0$$

$$\begin{cases} a = -2 \text{ و } 2 \\ a = 1 \checkmark \end{cases}$$

$$f(x) = \begin{cases} x^2 + 4x & ; x > 1 \\ 2x + 4 & ; x \leq 1 \end{cases}$$

$$f(1) = 1 + 4 = 5$$

$$f(x) = \begin{cases} 2x^2 - b & ; |x+1| \geq 2 \\ a + 2x & ; -3 \leq x < -1 \end{cases}$$

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

$$f(-3) = 18 - b = a - 6 \Rightarrow a + b = 24$$

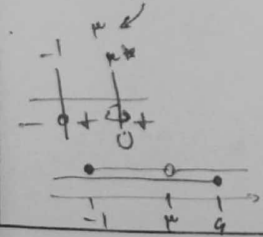
$$y = \sqrt{9x-a} + \sqrt{b-4x}$$

$$9x-a \geq 0 \xrightarrow{x=2} 18-a \geq 0 \rightarrow 18 \geq a$$

$$b-4x \geq 0 \xrightarrow{x=2} b-8 \geq 0 \rightarrow b \geq 8$$

$$\frac{b}{a} = \frac{8}{18} = \frac{4}{9}$$

$$y = \sqrt{\frac{x+1}{|x-3|}} + \sqrt{\frac{9-x}{x^2+2x+4}}$$

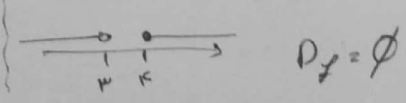


$$D_f = [-1, 3) \cup (3, 9]$$

$$y = \sqrt{[x]-4} + \sqrt{4-[x]}$$

$$[x]-4 \geq 0 \rightarrow x \geq 4$$

$$4-[x] \geq 0 \rightarrow 4 \geq [x]$$



$$D_f = \emptyset$$

الف) $y = \sqrt{x^2 - n - 4}$ $D_f = (-\infty, -r) \cup (r, +\infty) - \{r\}$ $\rightarrow y = \sqrt{\frac{x^2 - r^2 - an + 4}{x^2 + r^2 - an - 4}}$

$n^2 - 11n^2 + 49$

$(x-r)(x+r)$ $\frac{-r}{+} \frac{-r^*}{-} \frac{r}{+} \frac{r^*}{+}$

$(x-4)(x-4)$ $\frac{+}{+} \frac{-}{-} \frac{-}{-} \frac{+}{+}$

$\frac{1}{x^2 - 4} \rightarrow n^2 = 4 \rightarrow n = \pm 2$

$\frac{x^2 - r^2 - an + 4}{x^2 + r^2 - an - 4} \xrightarrow{\frac{n-1}{x^2 - n - 4}} (n-1)(n-r)(n+r)$

$\frac{-n^2 - an + 4}{-n^2 + n}$ $\frac{n^2 + r^2 - an - 4}{x^2 + r^2 - an - 4} \xrightarrow{\frac{n+1}{x^2 + n - 4}}$

$\frac{-4n + 4}{-4n + 4}$ $\frac{n^2 - an - 4}{n^2 + n}$ $\frac{n^2 - an - 4}{n^2 + n}$ $\frac{-4n - 4}{-4n - 4}$

$\frac{1}{x^2 - 4} \rightarrow n^2 = 4 \rightarrow n = \pm 2$

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الف) $y = \sqrt{[x] - r}$ $\rightarrow y = \frac{\omega x^r + 4}{[n]^r [x] - r}$

$[x] - r \geq 0$ $[n]^r - r[n] - r \neq 0$

$[x] \geq r \rightarrow n \leq -r$ $([n] - r)([n] + 1)$

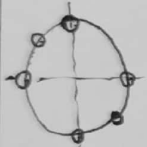
$D_f = (-\infty, r]$ $[n] \neq r$ $[n] \neq -1$

$r \leq n < r$ $-1 \leq n < 0$ $D_f = (-\infty, -1) \cup [0, r) \cup [r, +\infty)$

الف) $y = \frac{\cos x + 1}{\tan x + 1}$

$\tan x \neq -1$

$\sin x \neq 0$ $\cos x \neq 0$



$D_f = \mathbb{R} - \left\{ \frac{k\pi}{2}, k\pi + \frac{\pi}{2} \right\}$

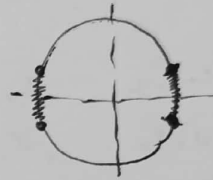
$\rightarrow y = \sqrt{1 - k \sin^2 x}$

$1 - k \sin^2 x \geq 0$

$1 \geq k \sin^2 x$

$\frac{1}{k} \geq \sin^2 x \rightarrow \frac{1}{\sqrt{k}} \geq |\sin x| \geq -\frac{1}{\sqrt{k}}$

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



الف) $y = \sqrt{1 - \log_{\frac{1}{4}} x}$

$x - 1 > 0 \rightarrow x > 1$

$1 - \log_{\frac{1}{4}} x \geq 0$ $D_f = \left[\frac{4}{3}, +\infty \right)$

$1 \geq \log_{\frac{1}{4}} x \rightarrow x - 1 \geq \frac{1}{4} \rightarrow x \geq \frac{5}{4}$

$\rightarrow y = \sqrt{x^r - n}$

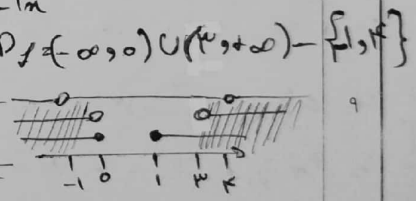
$1 - \log_{\frac{1}{4}} x^r - n$

$x^r - n \geq 0$ $D_f = (-\infty, 0) \cup (r, +\infty) - \{r\}$

$x^r - r^2 \geq 0$

$\log_{\frac{1}{4}} x^r - r^2 \neq 1 \rightarrow x^r - r^2 \neq k \rightarrow x^r - r^2 - k \neq 0$

$x \neq k \quad x \neq -1$



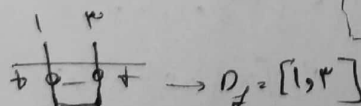
الف) $y = \sqrt{r^k x - n^r - \lambda}$

$r^k x - n^r - \lambda \geq 0$

$r^k x - n^r \geq \lambda$

$r^k x - n^r \geq r^2 \rightarrow x \geq \frac{r^2 + n^r}{r^k}$

$r^k x - n^r \geq r^2 \rightarrow x \geq \frac{r^2 + n^r}{r^k}$



$\rightarrow y = \left(\frac{r_n + a}{r_n + r} \right)!$

$\frac{r_n + a}{r_n + r} \in \mathbb{W}$ $D_f = \left\{ n \mid n = \frac{r_k - a}{r - r_k}, k \in \mathbb{W} \right\}$

$r_n + a = r_n + r$

$r_n - r_n = -a + r$

$n(r - r_n) = -a + r$ $n = \frac{-a + r}{r - r_n}$

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$D_f = (-\infty, -r) \cup [-r, -1) \cup [1, r) \cup [r, +\infty)$

