

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

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

$$y^2 + 4 + 4y + 2x^2 + 2 - 4x = 0 \quad \checkmark$$

$$k = 4 + 2 = 11$$

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

$$a^2 + 4a = 4a + a + 1$$

$$a^2 + a - 1 = 0 \quad \begin{cases} a = -2 \text{ و } 1 \\ a = 1 \quad \checkmark \end{cases}$$

$$f(n) = \begin{cases} n^2 + 4n & ; n > 1 \\ 4n + 5 & ; n \leq 1 \end{cases}$$

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

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

$$|n+1| \geq 2 \rightarrow n+1 \geq 2 \rightarrow n \geq 1$$

$$\rightarrow n+1 \leq -2 \rightarrow n \leq -3$$

$$f(-3) = 1n - b = a - 9 \Rightarrow a + b = 24$$

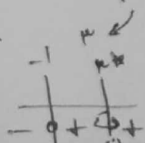
$$y = \sqrt{9n-a} + \sqrt{b-4n}$$

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

$$b-4n \geq 0 \xrightarrow{n=2} b-8 \geq 0 \rightarrow b \geq 8 \quad \checkmark$$

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

$$f(x) = \sqrt{\frac{x+1}{|n-3|}} + \sqrt{\frac{9-n}{x^2+2n+4}} \rightarrow 9$$



$$9-x \geq 0 \rightarrow 9 \geq x$$

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

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

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

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

$$D_f = \emptyset$$

الف) $y = \sqrt{x^2 - 4}$
 $x^2 - 4 \geq 0$
 $(x-2)(x+2) \geq 0$
 $x \leq -2$ or $x \geq 2$
 $D_f = (-\infty, -2] \cup [2, +\infty)$

ب) $y = \sqrt{x^2 - 4x + 4}$
 $x^2 - 4x + 4 \geq 0$
 $(x-2)^2 \geq 0$
 $D_f = (-\infty, +\infty)$

الف) $y = \sqrt{-x} - 2$
 $-x \geq 0$
 $x \leq 0$
 $D_f = (-\infty, 0]$

ب) $y = \frac{\omega x^2 + 4}{[x]^2 - 2[x] - 2}$
 $[x]^2 - 2[x] - 2 \neq 0$
 $([x] - 3)([x] + 1) \neq 0$
 $[x] \neq 3$ and $[x] \neq -1$
 $D_f = \{x \in \mathbb{R} \mid x \neq 3, x \neq -1\}$

الف) $y = \frac{\cos n + 1}{\tan n + 1}$
 $\tan n \neq -1$
 $\sin n \neq 0$ and $\cos n \neq 0$
 $D_f = \mathbb{R} \setminus \{k\pi, k\pi + \frac{\pi}{2}\}$

ب) $y = \sqrt{1 - \frac{1}{4} \sin^2 n}$
 $1 - \frac{1}{4} \sin^2 n \geq 0$
 $\frac{1}{4} \sin^2 n \leq 1$
 $D_f = [k\pi - \frac{\pi}{2}, k\pi + \frac{\pi}{2}]$

الف) $y = \sqrt{1 - \log_{\frac{1}{4}} x}$
 $x - 1 > 0 \rightarrow x > 1$
 $1 - \log_{\frac{1}{4}} x \geq 0$
 $\log_{\frac{1}{4}} x \leq 1$
 $x \leq 4$
 $D_f = (1, 4]$

ب) $y = \sqrt{x^2 - x}$
 $x^2 - x \geq 0$
 $x(x-1) \geq 0$
 $x \leq 0$ or $x \geq 1$
 $D_f = (-\infty, 0] \cup [1, +\infty)$

الف) $y = \sqrt{2^{k_n - n^2} - 1}$
 $2^{k_n - n^2} - 1 \geq 0$
 $2^{k_n - n^2} \geq 1$
 $k_n - n^2 \geq 0$
 $D_f = [1, 2]$

ب) $y = \left(\frac{2n + a}{2n + 1} \right)!$
 $\frac{2n + a}{2n + 1} \in \mathbb{N}$
 $2n + a = k(2n + 1)$
 $a = k(2n + 1) - 2n$
 $a = 2kn + k - 2n$
 $a = (2k - 2)n + k$
 $D_f = \{n \in \mathbb{N} \mid a = (2k - 2)n + k, k \in \mathbb{N}\}$

الف) $D_f = (-\infty, -2) \cup (-2, -1) \cup (1, 2) \cup (2, +\infty)$