

باب اول

$$f(x) = \sqrt{(a-x)x^2 + ax + b}$$

$$9a - 11 + 3a + b = 0 \rightarrow 12a + b + 11 = 0 \quad \Delta = 0 \rightarrow a^2 - 4b(a-1) = 0$$

$$\Rightarrow a^2 - 4(a-1)(11-12a) = 0 \quad b = -12a + 11 \quad b = -12 \times \frac{11}{4} = -33$$

$$= 0 \Rightarrow (12a-12)^2 = 0 \quad b = \frac{12a-12}{4}$$

$$\Rightarrow a = \frac{12}{4} \quad b = -\frac{11}{1}$$

$$f(x) = \sqrt{x^2 + 2x + 1 - m^2} \quad x^2 + 2x + 1 - m^2 \geq 0$$

$$\Delta \leq 0 \quad 4 - 4(1-m^2) \leq 0 \rightarrow 4 - 4 + 4m^2 \leq 0 \rightarrow 4m^2 - 4 \leq 0$$

$$-1 \leq m \leq 1 \rightarrow 1 - (-1) = 2$$

$$f(x) = \sqrt{f-x^2} \quad f-x^2 \geq 0 \rightarrow x^2 \leq f \rightarrow -\sqrt{f} \leq x \leq \sqrt{f}$$

$$[x] + [-x] + 1 \quad [x] + [-x] + 1 \neq 0$$

$$D_f = [-\sqrt{f} \sqrt{f}] \rightarrow \text{نقطة}$$

الف) $\sqrt{x^2 + 3x^2} \rightarrow x^2 + 3x^2 \geq 0 \rightarrow x^2(1+3) \geq 0 \rightarrow x^2 \geq 0$

ب) $\sqrt{\frac{(x^2-1)(x^2-3x^2)}{x^2-1}} = \frac{(x^2-1)x^2(x^2-3)}{x^2-1} \geq 0$

$$D_f = [-\infty -1] \cup \{0\} \cup [3 + \infty)$$

الف) $\sqrt{|x-2|} \geq 2 \rightarrow |x-2| \geq 4 \rightarrow |x-2| \geq 4$

$$\Rightarrow \begin{cases} x-2 \geq 4 & x \geq 6 \\ x-2 \leq -4 & x \leq -2 \end{cases} \quad D_f = (-\infty -2] \cup [6 + \infty)$$

ب) $\sqrt{f-|x-2|} \rightarrow f-|x-2| \geq 0 \rightarrow |x-2| \leq f$

$$\Rightarrow \begin{cases} x-2 \leq f & x \leq f+2 \\ x-2 \geq -f & x \geq 2-f \end{cases} \quad D_f = [2-f \quad f+2]$$

$$\text{الف) } \sqrt{1-x|x|} - 1 - x|x| \geq 0 \begin{cases} x \geq 0 \rightarrow 1-x^2 \geq 0 \\ x < 0 \rightarrow 1-x(-x) \geq 0 \end{cases}$$

$$1-x^2 \geq 0 \rightarrow x^2 \leq 1 \rightarrow 0 \leq x \leq 1$$

$$1-x(-x) \geq 0 \rightarrow 1+x^2 \geq 0 \rightarrow \text{دائمًا صحيح} \rightarrow x < 0$$

$$D_f = (-\infty, -1]$$

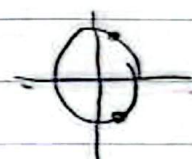
$$\text{ب) } \frac{1}{\sqrt{r-|x-a|-1}} \rightarrow r-|x-a|-1 > 0 \rightarrow r-|x-a| > 1$$

$$|x-a| < r \rightarrow \begin{cases} x-a < r \rightarrow x < r+a \\ x-a > -r \rightarrow x > -r+a \end{cases}$$

$$D_f = (r, r+a)$$

$$\text{الف) } \frac{\sin^2 x - 1}{\cos x} \rightarrow \cos x \neq 0$$


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

$$\text{ب) } \frac{\cos x}{r \cos x - 1} \rightarrow r \cos x - 1 \neq 0 \rightarrow \cos x \neq \frac{1}{r}$$


$$D_f = \mathbb{R} - \left\{ r k\pi \pm \frac{\pi}{r} \right\}$$

$$\text{الف) } \frac{x+r}{|rx+1| - |x+r|} \rightarrow |rx+1| - |x+r| \neq 0 \rightarrow$$

$$(rx+1)^2 \neq (x+r)^2 \rightarrow rx^2 + rx + 1 \neq x^2 + 2rx + r^2 \rightarrow$$

$$rx^2 - x - 1 \neq 0 \rightarrow x^2 - rx - \frac{1}{r} \neq 0 \rightarrow (x - \frac{r}{2})^2 - \frac{r^2}{4} - \frac{1}{r} \neq 0$$

$$x \neq \frac{r}{2} \pm \sqrt{\frac{r^2}{4} + \frac{1}{r}}$$

$$D_f = \mathbb{R} - \left\{ \frac{r}{2} \pm \sqrt{\frac{r^2}{4} + \frac{1}{r}} \right\}$$

$$\text{ب) } \sqrt{|rx+1|} - |x+r| \geq 0 \rightarrow |rx+1| \geq |x+r|$$

$$\rightarrow |rx+1|^2 \geq |x+r|^2 \rightarrow (rx+1)^2 \geq (x+r)^2$$

$$\rightarrow rx^2 + rx + 1 \geq x^2 + 2rx + r^2 \rightarrow rx^2 - x - 1 \geq 0$$

$$\frac{-\frac{1}{r} \pm \sqrt{\frac{1}{r^2} + 4r}}{2} \quad (-\infty, \frac{-\frac{1}{r} - \sqrt{\frac{1}{r^2} + 4r}}{2}] \cup [\frac{-\frac{1}{r} + \sqrt{\frac{1}{r^2} + 4r}}{2}, \infty)$$

$$f(x) = \sqrt{\log_{\omega} \log_{\omega}^{(r_{n-1})}} \quad r_{n-1} > 0 \quad x > \frac{1}{p} \quad (9)$$

$$\log_{\frac{1}{p}} \log_{\omega}^{r_{n-1}} \geq 0 \rightarrow \log_{\omega} r_{n-1} \leq 1 \rightarrow r_{n-1} \leq \omega$$

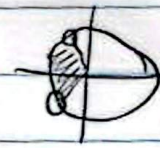
$$r_n \leq 4 \rightarrow x \leq 3$$

$$\log_{\omega} r_{n-1} > 0 \rightarrow r_{n-1} > 1 \rightarrow r_n > 2 \rightarrow x > 1 \quad D_f = (1, 3]$$

$$f(x) = \log(r \cos x + 1) \quad (10)$$

$$r \cos x + 1 > 0 \rightarrow \cos x > -\frac{1}{r}$$

$$D_f \left(r\pi - \frac{r\pi}{r}, r\pi + \frac{r\pi}{r} \right)$$



$$f(x) = \sqrt{\log \frac{x-1}{x+1}} \quad \frac{x-1}{x+1} > 0 \quad \frac{-1}{+\frac{1}{2}} - \frac{1}{-1} \quad (-\infty, -1) \cup [1, +\infty)$$

$$\log \frac{x-1}{x+1} \geq 0 \quad \frac{x-1}{x+1} \geq 1 \quad \frac{x-1-x-1}{x+1} \geq 0 \rightarrow \frac{-2}{x+1} \geq 0$$

$$\frac{-1}{+\frac{1}{2}} = (-\infty, -1) \quad D_f = (-\infty, -1)$$