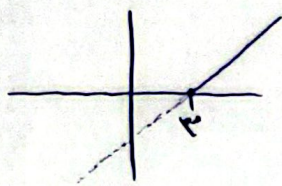


تکلیف 4

مسئله 5.1

بازدهم

$$f(x) = \sqrt{(a-x)x^2 + bx + c} \quad [x, +\infty) \quad (1)$$



$$a-x=0 \Rightarrow a=x$$

$$\sqrt{x^2 + b} \quad \sqrt{x^2 + b} \rightarrow b = -4$$

$$f(x) = \sqrt{x^2 + 2x + 2 - m^2} \quad \Delta = b^2 - 4ac = 4 - 4(1+m^2) = -4 + 4m^2 \leq 0 \quad (2)$$

$$\Delta \leq 0, \min, b$$

$$-m^2 \leq 1 \quad m^2 \leq 1 \quad -1 \leq m \leq 1 \quad 1 - (-1) = 2$$

$$f(x) = \frac{\sqrt{1-x^2}}{[x] + [-x] + 1} = \frac{\sqrt{(1-x)(1+x)}}{[x] + [-x] + 1} \rightarrow \pm 1 \Rightarrow \left\{ \frac{-1}{-1+1+1}, \frac{1}{-1+1+1} \right\}$$

$$D_f = \mathbb{Z} \cap D_{f(x)} = \mathbb{Z} \cap [-1, 1] = \{-1, 0, 1\}$$

$$f(x) = \sqrt{x^2 + x^2} \quad x^2 + x^2 \geq 0 \quad x^2(x+1) \geq 0 \Rightarrow \frac{-1}{-1+1+1} \quad (3)$$

$$\Rightarrow D_f = [-1, +\infty)$$

$$\therefore f(x) = \sqrt{\frac{(x^2-1)(x^2-5x^2)}{x^2-1}} \quad x^2-1 \neq 0 \rightarrow x \neq \pm 1 \quad (x^2-5x^2) = (x^2)(x-5)$$

$$(x^2-1) = (x+1)(x-1) \rightarrow \frac{-1}{-1+1+1} \quad \frac{1}{-1+1+1}$$

$$\Rightarrow D_f = (-\infty, -1] \cup [5, +\infty)$$

$$f(x) = \sqrt{|x-2| - 2} \quad |x-2| - 2 \geq 0 \quad |x-2| \geq 2 \quad x-2 \leq -2 \quad x \leq -1, x \geq 4 \quad D_f = \mathbb{R} - (-1, 4) \quad (4)$$

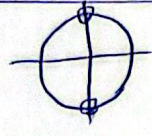
$$\therefore f(x) = \sqrt{4 - |x-2|} \quad 4 - |x-2| \geq 0 \quad 4 \geq |x-2| \quad x-2 \leq 4 \quad x \leq 6$$

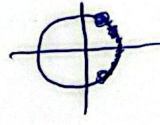
$$x-2 \geq -4 \quad -2 \leq x \leq 4$$

$$\Rightarrow D_f = [-2, 4]$$

الف) $y = \sqrt{1-x|x|}$ $1-x|x| \geq 0$ $1 \geq x|x|$ $\frac{1}{+} \frac{1}{-}$ $\cdot (4)$
 $\text{Def} = (-\infty, 1]$

ب) $y = \frac{1}{\sqrt{1-x|x|}}$ $\sqrt{1-x|x|} \geq 0$ $1-x|x| \geq 0$ $x \geq |x-1| \geq -x$
 $\sqrt{1-x|x|} \neq 1$ $1-x|x| \neq 1$ $x \neq |x-1|$ $x-1 \neq \pm x$ $x \neq 1, 0$
 $\text{Def} = [1, \infty) \cup (-\infty, -1]$

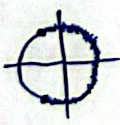
ج) $y = \frac{\sin^2 x - 1}{\cos x}$ $\cos x \neq 0$  $\cdot (4)$
 $\text{Def} = \mathbb{R} - \left\{k\pi + \frac{\pi}{2}\right\}$

د) $y = \frac{\cos x}{1-\cos x}$ $1-\cos x \neq 0$ $\cos x \neq 1$ 
 $\text{Def} = \mathbb{R} - \left\{2k\pi, 4k\pi\right\}$

هـ) $y = \frac{x+5}{|x+1| - |x+5|}$ $|x+1| - |x+5| \neq 0$ $|x+1| \neq |x+5|$ $x^2+x+1 \neq x^2+4x+4$
 $x^2-x-1 \neq 0$ $x^2-x-1 \neq 0$ $(x-4)(x+1) < \frac{x-5}{x-4}$
 $\Rightarrow \text{Def} = \mathbb{R} - \left\{-\frac{5}{4}, 4\right\}$

و) $y = \sqrt{|x+1| - |x+5|}$ $|x+1| - |x+5| \geq 0$
 $\frac{-\frac{5}{4}}{+} \frac{4}{-}$ $\text{Def} = \mathbb{R} - \left(-\frac{5}{4}, 4\right)$

ز) $f(x) = \sqrt{\log_{\frac{1}{2}} \log_{\frac{1}{2}} (x-1)}$ $\log_{\frac{1}{2}} \log_{\frac{1}{2}} (x-1) \geq 0$ $x-1 > 0$ $x > 1$ $\cdot (4)$
 $x-1 \geq 1$ $x \geq 2$ $\log_{\frac{1}{2}} (x-1) \geq 0, 2 \rightarrow \frac{x-1}{x-1} \leq 2$ $\Rightarrow \text{Def} = [1, 2]$

ح) $y = \log(x \cos x + 1)$ $x \cos x + 1 > 0$ $\cos x > -\frac{1}{x}$ $\cdot (10)$
 $\text{Def} = \mathbb{R} - \left(k\pi + \frac{\pi}{2}, k\pi + \frac{3\pi}{2}\right)$

ط) $y = \sqrt{\log_{\frac{x-1}{x+1}}}$ $\log_{\frac{x-1}{x+1}} \geq 0$ $\frac{x-1}{x+1} \geq 1 \rightarrow \frac{x-1-x-1}{x+1} \geq 0$ $\frac{-1}{+} \frac{-1}{-}$
 $x < -1$ $\frac{x-1}{x+1} > 0 \rightarrow \frac{1}{+} \frac{1}{-}$ $(-\infty, -1) \cap ((-\infty, -1) \cup [1, \infty)) = (-\infty, -1)$