

$$f(x) = \sqrt{(a-1)x^2 + 4x + b} \quad D_f = [3, +\infty)$$

$$b=1 \quad a-1=0 \quad 4x+b=0 \quad 4x-1=0 \Rightarrow x=1/4$$

$$a=1 \quad -\frac{b}{a}=3 \Rightarrow -b=4 \Rightarrow b=-4$$

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

$$\Delta < 0 \quad a > 0 \quad f - f(1-m^2) < 0 \quad f(1-m^2) - f = 0$$

$$m^2 - 1 \Rightarrow m = \pm 1$$

$$1 - (-1) = 2$$

$$f(x) = \sqrt{4-x^2}$$

$$[x] + [-x] = 0 \quad \text{if } x \in \mathbb{Z} \checkmark$$

$$[x] + [-x] + 1$$

$$[x] + [-x] = -1 \quad \text{if } x \notin \mathbb{Z}$$

$$4-x^2 \geq 0$$

$$x^2 \leq 4$$

$$-2 \leq x \leq 2$$

$$[-2, 2] \cap \mathbb{Z} = [-2, 2]$$

$$\{-2, -1, 0, 1, 2\}$$

$$a) y = \sqrt{x^3 + 3x^2}$$

$$x^3 + 3x^2 \geq 0$$

$$x^2(x+3) \geq 0$$

$$\frac{-3 \quad 0}{+ \quad + \quad +}$$

$$[-3, +\infty)$$

$$b) y = \sqrt{(x^2-1)(x^3-3x^2)}$$

$$x^2-1 \geq 0 \quad x^3-3x^2 \geq 0$$

$$x^2 \geq 1 \quad x^2(x-3) \geq 0$$

$$x \geq 3 \quad x \leq -1$$

$$\frac{-1 \quad 0 \quad 1 \quad 3}{+ \quad - \quad - \quad +}$$

$$(-\infty, -1] \cup [3, +\infty) \cup \{0\}$$

$$a) y = \sqrt{|x-2|-3}$$

$$|x-2|-3 \geq 0$$

$$|x-2| \geq 3$$

$$x-2 \geq 3$$

$$x-2 \leq -3$$

$$x \geq 5$$

$$x \leq -1$$

$$[5, +\infty)$$

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

$$b) y = \sqrt{4-|2-x|}$$

$$|2-x| \leq 4$$

$$-4 \leq 2-x \leq 4$$

$$-4 \leq -x \leq 2$$

$$-2 \leq x \leq 4$$

$$[-2, 4]$$

الف) $y = \sqrt{1-x x }$ $x x \leq 1$ $x(-x) \leq 1$ ① $-x^2 \leq 1$ ✓ ب) $y = \frac{1}{\sqrt{3- x-a }-1}$ دست $Df = [3, \infty) - \{3, 5\}$	$1-x x \geq 0$ $x x \leq 1$ $x = -x \quad x \leq 0$ $x = x \quad x \geq 0$ $x^2 \leq 1$ ② $-1 \leq x \leq 1$ [0, 1]	$x x = 1$ $x^2 = 1$ $x = \pm 1$ $\frac{1}{-1+}$ ① $\cup$ ② = $(-\infty, 1]$ $\sqrt{3- x-a } \neq 1$ $3- x-a \neq 1$ $x-a \neq 2$ $x-a \neq \pm 2$ $x \neq a \pm 2$
الف) $y = \frac{\sin^2 x - 1}{\cos x}$ ب) $y = \frac{\cos x}{\cos x - 1}$	$\cos x \neq 0$ $\cos x \neq \frac{1}{\cos x - 1}$	$\mathbb{R} - \left\{ k\pi + \frac{\pi}{2} \right\}$ $\mathbb{R} - \left\{ 2k\pi - \frac{\pi}{2}, 2k\pi + \frac{\pi}{2} \right\}$
$y = \frac{x+3}{ x+1 - x+3 }$ ب) $y = \sqrt{ x+1 - x+3 }$ $x+1 \geq x+3$	$x+1 \neq x+3$ $(x+1)^2 \neq (x+3)^2$ $x^2 + 2x + 1 \neq x^2 + 6x + 9$ $2x + 1 \neq 6x + 9$ $-4x \neq 8$ $x \neq -2$	$\mathbb{R} - \left\{ -\frac{2}{3}, 2 \right\}$
$f(x) = \sqrt{\log_{0.5}(x-1)}$ $x-1 > 0$ $x > 1$ $x > \frac{1}{2}$ (I)	$\log_{0.5}(x-1) \geq 0$ $x-1 \leq 1$ $x \leq 2$ $x > 1$ $x > 1$ (II)	$\log_{0.5}(x-1) \leq 1$ $x-1 \leq \frac{1}{0.5}$ $x-1 \leq 2$ $x \leq 3$ $x \leq 3$ (III) $I \cap II \cap III = (1, 2]$
الف) $\log(\cos x + 1)$ ب) $y = \sqrt{\log_{10} \frac{x-1}{x+1}}$	$\cos x + 1 > 0$ $\cos x > -1$ $\cos x > -\frac{1}{2}$ $\frac{x-1}{x+1} > 0$ $\frac{x-1}{x+1} \geq 1$ $x+1 < 0$ $x < -1$ (II)	$\left(2k\pi - \frac{\pi}{2}, 2k\pi + \frac{\pi}{2} \right)$ $\frac{x-1}{x+1} \geq 1$ $\frac{x-1}{x+1} \geq \frac{x-1}{x+1}$ $(-\infty, -1)$