

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

$$b=1 \quad a-2=0 \quad 4x+b=0 \quad 2x-4=0 \Rightarrow x=3$$

$$a=2 \quad -\frac{b}{a} = 3 \Rightarrow -b=4 \Rightarrow b=-4$$

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

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

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

$$f - f(2-m^2) < 0 \quad m^2 \geq 1 \Rightarrow m = \pm 1$$

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

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

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

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

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

$$x^2 \leq 4$$

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

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

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

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

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

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

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

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

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

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

$$x \geq 3 \quad x = 1$$

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

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

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

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

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

$$x-2 \geq 3 \quad x-2 \leq -3$$

$$x \geq 5 \quad x \leq -1$$

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

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

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

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

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

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

$$[-2, 4]$$

$y = \sqrt{1-x|x|}$ $1-x|x| \geq 0$ $x|x| \leq 1$ $x|x| = 1$
 $x|x| \leq 1$ $|x| = -x$ $x \leq 0$ $x|x| = 1$ $x = 1$
 $x(-x) \leq 1$ 1 $x \leq 0$ $x|x| = -1$ $x = -1$
 $-x^2 \leq 1$ $|x| = x$ $x \geq 0$ $x|x| = 1$ $x = 1$
 $y = \frac{1}{\sqrt{1-x|x|}}$ $1-x|x| \geq 0$ $x|x| \leq 1$ $x|x| = 1$ $x = 1$
 $Df = [1, 1] - \{1, 1\}$ $1-x|x| \geq 0$ $x|x| \leq 1$ $x|x| = 1$ $x = 1$
 $y = \frac{\sin^2 x - 1}{\cos x}$ $\cos x \neq 0$ $1 - \{k\pi + \frac{\pi}{2}\}$ $x \neq \frac{\pi}{2} + k\pi$
 $y = \frac{\cos x}{\cos x - 1}$ $\cos x \neq 1$ $1 - \{2k\pi, 2k\pi + \frac{\pi}{2}\}$ $x \neq 2k\pi$

$y = \frac{x+3}{|x+1| - |x+3|}$ $|x+1| \neq |x+3|$ $(x+1)^2 \neq (x+3)^2$ $1 - \{1, 3\}$
 $x^2 + 2x + 1 \neq x^2 + 6x + 9$
 $4x - 8 \neq 0$ $x \neq 2$
 $y = \sqrt{|x+1| - |x+3|}$ $|x+1| \geq |x+3|$ $x^2 - 2x - 2 \geq 0$ $(x-4)(x+2) \geq 0$ $x \leq -2$ or $x \geq 4$
 $y = \frac{x+3}{|x+1| - |x+3|}$ $|x+1| \geq |x+3|$ $x^2 - 2x - 2 \geq 0$ $(x-4)(x+2) \geq 0$ $x \leq -2$ or $x \geq 4$

$f(x) = \sqrt{\log_{0.5}(x-1)}$ $\log_{0.5}(x-1) \geq 0$ $x-1 \leq 1$ $x \leq 2$ $x > 1$ $1 < x \leq 2$ $I \cap II \cap III = (1, 2]$
 $\log_{0.5}(x-1) \geq 0$ $x-1 \leq 1$ $x \leq 2$ $x > 1$ $1 < x \leq 2$ (I)
 $\log_{0.5}(x-1) \geq 0$ $x-1 \leq 1$ $x \leq 2$ $x > 1$ $1 < x \leq 2$ (II)
 $\log_{0.5}(x-1) \geq 0$ $x-1 \leq 1$ $x \leq 2$ $x > 1$ $1 < x \leq 2$ (III)

$\log(\cos x + 1)$ $\cos x + 1 > 0$ $\cos x > -1$ $\cos x > -\frac{1}{2}$ $x \in (-\frac{2\pi}{3}, 2\pi)$
 $y = \sqrt{\log_{10} \frac{x-1}{x+1}}$ $\log_{10} \frac{x-1}{x+1} \geq 0$ $\frac{x-1}{x+1} \geq 1$ $x-1 \geq x+1$ $-2 \geq 0$ $(I) \cap (II) = (-\infty, -1)$
 $\log_{10} \frac{x-1}{x+1} \geq 0$ $\frac{x-1}{x+1} \geq 1$ $x-1 \geq x+1$ $-2 \geq 0$ $(I) \cap (II) = (-\infty, -1)$