

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



$$a-2=0$$

$$a=2$$

$$2x+b \rightarrow (3,0) \quad 5x+b=0 \quad b=-6$$

(1)

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



(2)

$$\Delta \leq 0$$

$$4 - (4 \times 2 - m^2) \Rightarrow 4 - 8 + m^2 \leq 0$$

$$m^2 - 4 \leq 0 \quad m^2 \leq 4 \quad |m| \leq 2$$

$$1 - -1 = 2$$

$$m^2 \leq 4 \quad |m| \leq 2$$

$$m^2 \leq 1$$

$$1 \leq m \leq 1$$

$$f(x) = \sqrt{4 - x^2} \geq 0 \rightarrow \sqrt{4} \geq x^2 \rightarrow |x| \leq 2 \rightarrow -2 \leq x \leq 2$$

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

$$z \rightarrow 0$$

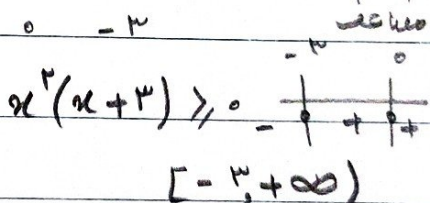
$$z \rightarrow -1$$

$$-2 \quad -1 \quad 0 \quad 1 \quad 2$$

$$\Delta$$

(3)

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



(4)

$$ب) \sqrt{\frac{(x^2-1)(x^3-3x^2)}{x^3-1}} \rightarrow \frac{(x+1)(x-1)(x^2(x-3))}{x^3-1}$$

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



$$\sqrt{|x-2|} = 3$$

$$|x-2| \geq 9$$

$$x-2 \geq 9$$

$$x-2 \leq -9$$

$$(\infty, -1] \cup [11, \infty)$$

$$x \geq 11$$

$$x \leq -11$$

(5)

$$\sqrt{4 - |2 - x|}$$

$$4 \geq |2 - x| \rightarrow 4 \geq 2 - x \geq -4$$

$$x \geq -2 \geq -6$$

$$-2 \leq x \leq 6$$

(5)

$$\sqrt{1 - x|x|}$$

$$1 \geq x|x|$$

$$x \rightarrow x^2 \rightarrow$$

$$1 - x^2 \rightarrow$$

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

$$\sqrt{1 - x^2}$$

$$x \rightarrow -x^2 \rightarrow$$

$$1 + x^2$$

$$1 \geq |x|$$

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

$$1 \geq x \geq -1$$

(6)

ب)

$$\frac{1}{\sqrt{3 - |x - 5|} - 1}$$

$$\neq 1$$

$$3 - |x - 5| \geq 0$$

$$3 \geq |x - 5|$$

$$3 \geq x - 5 \geq -3$$

$$3 - |x - 5| \neq 1$$

$$2 \geq |x - 5|$$

$$|x - 5| \neq 2$$

$$x \neq 7, 3$$

$$D_f = [2, 8] - \{7\} \cup \{3\}$$

$$\frac{\sin^2 x - 1}{\cos x}$$



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

(7)

$$\frac{\cos x}{2 \cos x - 1}$$

$$2 \cos x - 1 \neq 0$$

$$\cos x \neq \frac{1}{2}$$



$$R = \left\{ 2k\pi + \frac{\pi}{3}, 2k\pi + \frac{2\pi}{3} \right\}$$

(8)

$$f(x) = \frac{x + 3}{|2x + 1| - |x + 3|}$$

$$|2x + 1| - |x + 3| \neq 0$$

$$(|2x + 1| \neq |x + 3|)$$

$$4x^2 + 5x + 1 \neq x^2 + 6x + 9$$

$$3x^2 - x - 8 \neq 0 \rightarrow x^2 - 2x - 2 \neq 0$$

(9)

$$R = \left\{ 2 \right\} \cup \left\{ \frac{-1}{3} \right\}$$

$$(x - 6)(x + 4)$$

$$\frac{5}{3}, \frac{-1}{3}$$

$$\log_a x = x \quad x = \frac{1}{a}$$

$$b) \sqrt{|2x+1| - |x+3|} \geq 0 \quad (2x+1)^2 \geq (x+3)^2 \quad (1)$$

$$4x^2 + 4x + 1 \geq x^2 + 6x + 9$$

$$3x^2 - 2x - 8 \geq 0 \quad x^2 - 2x - \frac{8}{3} \rightarrow (x-4)(x+\frac{2}{3})$$



$$\log_a (2x-1)$$

$$2x-1 > 0$$

$$x > \frac{1}{2}$$

$$\log_a (2x-1) > 0$$

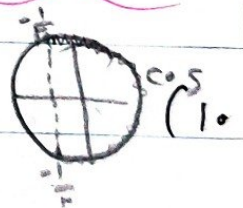
$$x > 1 \leftarrow 2x-1 > 1$$

$$\log_a \log_a (2x-1) > 0 \rightarrow \log_a (2x-1) > 1 \rightarrow 2x-1 > a \rightarrow x > \frac{a+1}{2}$$

$$x = (1, \frac{a+1}{2}]$$

$$c) \log_{10} (2\cos^2 x + 1)$$

$$2\cos^2 x + 1 > 0 \rightarrow \cos x > -\frac{1}{2} \rightarrow (k\pi - \frac{\pi}{3}, k\pi + \frac{\pi}{3})$$



$$d) = \sqrt{\log_{10} \frac{x-1}{x+1}}$$

$$\frac{x-1}{x+1} > 0$$

$$(-\infty, -1) \cup [1, \infty)$$

$$\log_{10} \frac{x-1}{x+1} > 0$$

$$\frac{x-1-x-1}{x+1} > 1$$

$$\frac{x-1-x-1}{x+1} > 0 \rightarrow \frac{-2}{x+1} > 0$$

$$(-\infty, -1)$$