

الف) $y = \frac{z+3}{z^2+z^2-12z+3} \Rightarrow \frac{z^2+z^2-12z+3}{-2z^2+2z^2} \mid \frac{z-1}{2z^2+5z-3}$

$\frac{z+3}{(z-1)(2z^2+5z-3)}$

$\downarrow$ (1) (2) (3)

$D_f = \mathbb{R} - \left\{1, \frac{1}{2}, -3\right\}$

ب) $y = \frac{z+3}{z^2+9z^2+16z+3}$

$\frac{z^2+9z^2+16z+3}{-2z^2-2z^2} \mid \frac{z+1}{2z^2+7z+3}$

$\frac{z+3}{(z+1)(2z^2+7z+3)}$

$\downarrow$ (1) (2) (3)

$D_f = \mathbb{R} - \left\{-3, -\frac{1}{2}, -1\right\}$

الف) $y = \frac{z+3}{z^2-2z^2+z^2-1}$

$\frac{z^2-2z^2+z^2-1}{-2z^2+z^2} \mid \frac{z-1}{z^2-2z+1}$

$\frac{z+3}{(z-1)(z^2-2z+1)}$

$\downarrow$ (1) (2) (3)

$D_f = \mathbb{R} - \{1\}$

ب) $y = \sqrt{\frac{z+3}{z^2-2z^2+z^2-1}}$

$\frac{-z}{+ \phi - \frac{1}{\phi} +}$

$D_f = (-\infty, -3] \cup (1, +\infty)$

$y = \frac{z}{z^2-5(z-1)-2z+5}$

$\frac{z^2-5(z-1)-2z+5}{z^2+3z} \mid \frac{1}{z^2-7z+10}$

$\frac{z}{z(z+3)}$

$\downarrow$ (1) (2) (3)

$D_f = \mathbb{R} - \{-3, 0, 2, 5\}$

الف) $y = \frac{z+3}{|2z+1|-|z-3|}$

$D_f = \mathbb{R} - \{2\} - \left\{-\frac{4}{3}\right\}$

ب) $y = \sqrt{|2z+1|-|z-3|}$

$\frac{-z}{-2, 2} \oplus \frac{-1}{2, -2} \oplus \frac{1}{2, -2}$

$\downarrow$ (1) (2) (3)

$D_f = (-\infty, -\frac{2}{3}] \cup [2, +\infty)$

الف) $y = \log_r(1-\log_r^2)$

$z > 0 \rightarrow 1-\log_r^2 > 0$

$z < 2 \rightarrow D_f = (0, 2)$

ب) $y = \log_r(1-\log_r^2)$

$z > 0 \rightarrow \log_r^2 < 1 \rightarrow z < \frac{1}{r}$

$D_f = \left(\frac{1}{r}, +\infty\right)$

$$f(z) = \sqrt{\log_{\Delta}^{(z-1)}} \geq 0 \quad \log_{\Delta}^{(z-1)} > 0 \quad z-1 > 1 \quad z > 2 \quad \checkmark$$

$$\log_{\Delta}^{z-1} \geq 1 \rightarrow z \leq 3$$

$$D_f = (1, 3] \quad \textcircled{1} - \gamma$$

$$y = \log(\sqrt{\cos z} + 1) \quad \sqrt{\cos z} + 1 > 0 \quad \sqrt{\cos z} > -1 \quad \cos z > -\frac{1}{2}$$

$$D_f = (2k\pi - \frac{\pi}{3}, 2k\pi + \frac{\pi}{3}) \quad \textcircled{1} - \gamma$$

$$y = \sqrt{\log \frac{z-1}{z+1}} \geq 0 \quad \frac{z-1}{z+1} > 0$$

$$\frac{z-1}{z+1} \geq 1 \rightarrow z < -1$$

$$D_f = (-\infty, -1) \quad \textcircled{1} - \gamma$$

$$f(z) = \sqrt{(a+z^2)x^2 + b} \quad \sqrt{x^2 + b}$$

$$a+z^2 = 0 \rightarrow a = -z^2 \quad \checkmark$$

$$\frac{b}{z} = z \rightarrow b = z^2 \quad \checkmark \quad z \geq 2 \quad \checkmark$$

$$-x^2 + b \geq 0 \quad b \geq x^2 \quad \checkmark$$

$$f(z) = \sqrt{z^2 + 2z + 2 - m^2} \quad -\sqrt{2} \leq m \leq \sqrt{2}$$

$$[-\sqrt{2}, \sqrt{2}] \quad \sqrt{2} - (-\sqrt{2}) = 2\sqrt{2}$$

$a > 0$

$$\Delta \leq 0 \rightarrow 4 - 4(2 - m^2) \leq 0 \rightarrow -1 \leq m \leq 1 \rightarrow \text{max, max اختلاف} = \textcircled{2}$$

$$f(z) = \frac{\sqrt{4 - z^2}}{[z] + [-z] + 1}$$

$$4 - z^2 \geq 0 \quad z \geq 2$$

$$[-2 \leq z \leq 2]$$

$$D_f = [-2, 2] - \{1\}$$

$$[-2, -1) \cup (1, 2] \quad \checkmark$$

$$\{n \in \mathbb{Z} \rightarrow [n] + [-n] = 0 \quad \checkmark$$

$$n \notin \mathbb{Z} \rightarrow [n] + [-n] = -1 \rightarrow \text{مخرج راصفد مكن} \quad \times$$