

11/9/20

$$\cancel{f(z)} g(z) = \sqrt{m+z} - \sqrt{m-z} \xrightarrow{z = \sqrt{m-r}} \sqrt{z-r} \quad \begin{matrix} m > 1 & m-r > r & \sqrt{m-r} \geq r & z \geq r \end{matrix} \quad -1$$

$$f(z) = \sqrt{m-r+r} \sqrt{z-r} \rightarrow \sqrt{(z+r)^2} \quad |z+r| = \sqrt{m-r} + r \xrightarrow{+} r\sqrt{m-r} = f(z)g(z)$$

$$\sqrt{\frac{m-r}{c}} + \frac{a}{b} = \frac{a+b}{c} = \frac{r}{-r} = \boxed{-\frac{1}{r}}$$

$$f(z) = \frac{m+r}{m^2 - m + r^2} \Rightarrow f(z) = \left\{ (r, -r), \left(1, \frac{r}{0}\right), \left(\frac{r}{0}, \frac{r}{0}\right), \left(0, \frac{r}{r}\right) \right\} \quad \frac{g}{f} = \left\{ \left(r, \frac{1}{-r}\right), \left(0, \frac{r}{r}\right) \right\} = \left\{ \left(r, -\frac{1}{r}\right), \left(0, 1\right) \right\} \quad -2$$

$$\text{الف) } m=1 \quad n=\frac{1}{r} \Rightarrow \left(\frac{1}{r}, r\right) \rightarrow \left\{ \left(\frac{1}{r}, r\right), \left(\frac{r}{r}, -1\right), (r, r), \left(-\frac{1}{r}, r\right) \right\} \quad -3$$

$$\text{ب) } m^2=1 \quad n=\pm 1 \Rightarrow (1, r), (-1, r) \rightarrow \left\{ (1, r), (-1, r), (\sqrt{m}, -1), (-\sqrt{m}, -1), (r, r), (-r, r) \right\} \quad m^2 \neq -1 \rightarrow (-1, r)$$

$$\text{ج) } r g^2(m) + 1 \xrightarrow{-1} \frac{r(m^2) + 1}{19} \Rightarrow (-r, 19) \rightarrow \left\{ (-r, 19), (1, r), (r, 9), (-1, 1) \right\}$$

$$\text{د) } \frac{r}{g} \Rightarrow \left\{ \left(1, \frac{r}{-1}\right), \left(r, \frac{-r}{r}\right), \left(-1, \frac{1}{0}\right) \right\} = \left\{ (1, -r), (r, -1) \right\}$$

$$h = \left\{ (r, r+r), (r, r+r), (-r, 0+r) \right\} = \left\{ (r, r), (r, r), (-r, r) \right\} \quad -5$$

$$D_g = \mathbb{R} \quad D_f = \{m \geq 0 \mid m \geq 0 \quad \sqrt{m} \geq m \quad m \geq m^2 \quad 0 \geq m^2 - m \quad [0, 1^m] \quad n \geq 0 \quad A \Rightarrow [0, 1^m] = D_f \quad -\Delta$$

$$g+1 \neq 0 \quad g \neq -1 \Rightarrow D_g \stackrel{B}{=} \mathbb{R} - \mathbb{Z} \Rightarrow R_g = -1 \times \quad \mathbb{Z} \cap [0, 1^m] \Rightarrow D\left(\frac{f}{g+1}\right) = \{0, 1, 2, \dots, m\}$$

$$D_g = \mathbb{Z} \quad R_g = 0 \Rightarrow g \quad g \neq -1 \quad \checkmark$$

$$f(m) = \sqrt{am - m^2 - r} \quad \xrightarrow{1} \sqrt{a - r} = a \Rightarrow (1, 0) \quad \xrightarrow{\text{نقطة التقاطع}} \quad f(m) = \{(1, 0), (r, \sqrt{r}), (r, 0), (a, \sqrt{a-r})\}$$

$$h(m) = \left\{ \left(1, \frac{a}{m}\right), \left(r, \frac{\sqrt{r}}{r}\right), \left(r, \frac{0}{r}\right) \right\} = \left\{ (1, 0), \left(r, \frac{\sqrt{r}}{r}\right), (r, 0) \right\}$$

$$\text{الف) } m^m - m^{m-1} + m - 1 + 1 \Rightarrow y = (m-1)^m + 1 \quad y - 1 = (m-1)^m \quad \sqrt[m]{y-1} + 1 = m \quad \rightarrow \boxed{\mathbb{R}} \quad (-\infty, -1) \cup (0, +\infty)$$

$$\rightarrow y_m^m - m y_m = 1 \quad y_m^m - m y_{m-1} = 0 \quad \Delta \geq 0 \leq \dots \leq \sqrt{\Delta} \quad \rightarrow \quad r y^m + r y \geq 0 \quad \checkmark$$

$$\Delta^2 - 4ac \rightarrow r y^m - r y_{m-1} = r y^m + r y = \Delta \quad y^m + y \geq 0 \quad \begin{matrix} -1 & 0 \\ + & - & + \end{matrix}$$

الف) $y = \frac{m^2 - 4m + 4 + 4}{(m-2)^2}$ $y-4 = (m-2)^2$ $\sqrt{y-4} = m-2$ $m = \sqrt{y-4} + 2$ $y-4 \geq 0$
 $y \geq 4$

ب) $-y = m^2 - 4m - 3 \Rightarrow -y = \frac{m^2 - 4m - 3 + 12 - 12}{(m-2)^2}$ $\Rightarrow 12 - y = (m-2)^2 \Rightarrow \sqrt{12-y} = m-2$ $\Rightarrow 12-y \geq 0$
 $\sqrt{12-y} = (m-2)$ $12 \geq y$

ج) $y = \frac{m^2 - 4m - 3 + 4 - 4}{(m-2)^2}$ $y+4 = (m-2)^2$ $\sqrt{y+4} = m-2$ $y+4 \geq 0$ $y \geq -4$ $y \geq 0$

د) $-y = \frac{m^2 - 4m + 4 - 4}{(m-2)^2}$ $9-y = (m-3)^2$ $\sqrt{9-y} = m-3$ $9-y \geq 0$ $9 \geq y$ $y = \sqrt{m}$ $y \geq 0$
 $9 \geq y \geq 0$

الف) $\mathbb{R}$ ب) $\mathbb{R}$ ج) $\mathbb{R} - \mathbb{R}^- = [0, +\infty)$ د) $\mathbb{R} - \mathbb{R}^- = [0, +\infty)$

الف) $\mathbb{R} - \{3\}$ ب) $\mathbb{R} - \{2\}$

الف) $\mathbb{R} - \{\frac{a}{a}\}$ ب) $\mathbb{R} - \{\frac{a}{a}\}$