

الف) $y = \frac{x+r}{2x^2+3x^2-11x+r} \xrightarrow{r+r-11r=0} x=1 \rightarrow h=0 \rightarrow \begin{array}{c|ccc|c} 1 & 2 & 3 & -11 & r \\ \hline & 2 & 4 & -7 & 0 \end{array}$

$h = (x-1)(2x^2+4x-7)$ (1)

$D_f = \mathbb{R} - \{1, -\frac{7}{2}, \frac{1}{2}\}$

$(x-1)(x+\frac{7}{2})(2x-1)$

$h = (x-1)(x+r)(2x-1)$

$h \neq 0 \rightarrow x \neq 1, -\frac{7}{2}, \frac{1}{2}$

ب) $y = \frac{x+r}{2x^2+9x^2+10x+r} \xrightarrow{r+10r+r} x=-1 \rightarrow h=0 \rightarrow \begin{array}{c|ccc|c} -1 & 2 & 9 & 10 & r \\ \hline & 2 & 11 & 9 & 0 \end{array}$

$h = (x+1)(2x^2+11x+9)$

$(x+1)(x+\frac{9}{2})(2x+1)$

$h \neq 0 \rightarrow x \neq -1, -\frac{9}{2}, -\frac{1}{2}$

$h = (x+1)(x+r)(2x+1)$

$D_f = \mathbb{R} - \{-1, -\frac{9}{2}, -\frac{1}{2}\}$

الف) $y = \frac{x+r}{x^2-2x^2+2x-1} \xrightarrow{1-r+r-1=0} x=1 \rightarrow h=0 \rightarrow \begin{array}{c|ccc|c} 1 & 1 & -2 & 2 & -1 \\ \hline & 1 & -1 & 1 & 0 \end{array} \rightarrow (x-1)(x^2-x+1) = h$

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

$\Delta < 0 \rightarrow$ همیشه نامعادله

$h \neq 0 \rightarrow x \neq 1$

ب) $y = \sqrt{\frac{x+r}{x^2-2x^2+2x-1}}$

$(x-1)(x^2-x+1)$

$D_f = \{-\infty, -r\} \cup (1, +\infty)$

$y = \frac{r}{x^2-a(x-1)-2x+a}$

$x^2-ax+a-2x+a = h \rightarrow h \neq 0 \quad I \quad x \geq 1$

$x^2-2x+1+a = (x-1)(x-a) = h \quad II$

$h \neq 0 \rightarrow x \neq 1, x \neq a, r$

$I \cap II \rightarrow x \neq 1, a$

$x^2+a(x-1)-2x+a$ $I \quad x \leq 1$

$x^2+2x = y \rightarrow y(x+r) = y$

$y \neq 0 \rightarrow x \neq 0, -r \quad II$

$D_f \subseteq \mathbb{R} - \{0, -r, 1, a\}$

الف) $y = \frac{x+r}{|2x+1|-|x+r|} \rightarrow |2x+1|-|x+r| \neq 0 \rightarrow |2x+1| \neq |x+r|$

$x \neq \frac{r}{3} \leftarrow (x-r)(x+r) \neq 0 \quad 2x^2-2x-1 \neq 0 \leftarrow 2x^2+2x+1 \neq 2x^2+2x+9$

$x \neq -\frac{r}{2} = -r$

$D_f = \mathbb{R} - \{-r, \frac{r}{3}\}$

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

$$I \quad f-x^2 \geq 0 \rightarrow -r < x < r$$

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$$[x] + [-x] + 1 \quad II \quad [x] + [-x] + 1 \neq 0$$

$$\downarrow$$

$$x \in \mathbb{Z} \rightarrow [x] - [x] + 1 = 1 \quad \checkmark$$

$$x \notin \mathbb{Z} \rightarrow [x] - [x] - 1 + 1 = 0 \quad \times \quad \left. \vphantom{x \notin \mathbb{Z}} \right\} x \in \mathbb{Z}$$

$$\underline{I \cap II} \rightarrow x \in \{-r-1, 0, 1, r\} \rightarrow D = \{-r-1, 0, 1, r\}$$