

1) $y = \frac{\sinh x}{r \cosh x - 1}$

$r \cosh x - 1 \neq 0$
 $r \cosh x \neq 1$
 $\cosh x \neq \frac{1}{r}$

$D_f = R - \left\{ yKR + \frac{R}{y} \right\} = R - \left\{ yKR + \frac{1}{y} \right\}$

2) $y = \frac{\cosh x + 1}{r \sinh x + 1}$

$r \sinh x + 1 \neq 0$
 $r \sinh x \neq -1$

$\sinh x \neq -\frac{1}{r}$

$D_f = R - \left\{ yKR + \frac{R}{y} \right\} = R - \left\{ yKR + \frac{1}{y} \right\}$

3) $\frac{\tanh x + r}{\cosh x - 1}$

$\cosh x \neq 1$
 $\frac{\cosh x}{\sinh x} \rightarrow \sinh x \neq 0 \rightarrow \sinh x \neq 0$

$D_f = R - \left\{ yKR + \frac{R}{y} \right\} = R - \left\{ yKR + \frac{R}{y} \right\}$

4) $\frac{\sinh x + 1}{r \sinh x - r}$

$r \sinh x - r \neq 0$
 $r \sinh x \neq r$
 $\sinh x \neq \frac{r}{r}$

$D_f = R - \left\{ yKR + \frac{R}{y} \right\} = R - \left\{ yKR + \frac{R}{y} \right\}$

الف) $x^2 - \omega x + \gamma > 0$

$(x - \gamma)(x - \omega) > 0$
 $x = \gamma \quad x = \omega$

$\frac{\gamma}{+} - \frac{\omega}{+} \quad D = (-\infty, \gamma) \cup (\omega, +\infty)$

ب) $x^2 - \gamma x + \omega < 0$

$(x - 1)(x - \omega) < 0$
 $x = 1 \quad x = \omega$

$\frac{1}{+} - \frac{\omega}{+} \quad D = (1, \omega)$

ج) $x^2 + \gamma x + \omega > 0$

$(x + 1)(x + \omega) > 0$
 $x = -1 \quad x = -\omega$

$\frac{-\omega}{+} - \frac{-1}{+} \quad D = (-\infty, -\omega] \cup [-1, +\infty)$

د) $x^2 - \gamma x + \gamma < 0$

$(x - 1)(x - \gamma) < 0$
 $x = 1 \quad x = \gamma$

$\frac{1}{+} - \frac{\gamma}{+} \quad D = [1, \gamma]$

الف) $\frac{x^2 - \gamma x + \gamma}{x - \omega} < 0$

$\frac{(x - 1)(x - \gamma)}{x - \omega} < 0$
 $x = 1 \quad x = \gamma \quad x = \omega$

$\frac{1}{-} - \frac{\gamma}{+} - \frac{\omega}{+} \quad D = (-\infty, 1) \cup (\gamma, \omega)$

ب) $\frac{x^2 - 1}{x^2 - \gamma x + \omega} \geq 0$

$\frac{(x + 1)(x - 1)}{(x - 1)(x - \omega)} \geq 0$
 $x = -1 \quad x = 1 \quad x = \omega$

$\frac{-1}{+} - \frac{1}{-} - \frac{\omega}{+} \quad D = (-\infty, -1] \cup (\omega, +\infty)$

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$$y = \frac{x - f(x)}{f(x)}$$

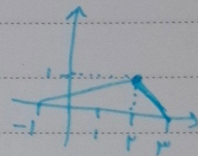
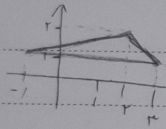
$$f(x) = x^r - 1$$

$$D_f = \left(-\infty, \frac{x^r - x - 1}{x^r - 1} \right]$$

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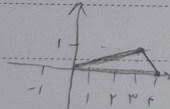
$$y = \frac{x - (x^r - 1)}{x^r - 1} \rightarrow y = \frac{-x^r + x + 1}{x^r - 1} \rightarrow \frac{-x^r + x + 1}{x^r - 1} \geq 0 \rightarrow \frac{x^r - x - 1}{x^r - 1} \leq 0$$

a) $f(x) + 1$

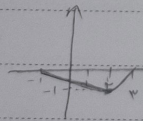


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b) $f(x-1)$



c) $-f(x)$



d) $f(x+1) + r$

