



الف)  $x^2 - 5x + 6 \geq 0 \rightarrow (x-2)(x-3)$   
 $+ \quad - \quad +$   
 $D_f = (-\infty, 2] \cup [3, +\infty)$

ب)  $x^2 - 4x + 4 \leq 0 \rightarrow (x-2)(x-2)$   
 $+ \quad - \quad +$   
 $D_f = \{2\}$

ج)  $x^2 + 2x + 1 \geq 0 \rightarrow (x+1)(x+1)$   
 $- \quad - \quad +$   
 $D_f = (-\infty, -1] \cup [-1, +\infty)$

د)  $x^2 - 7x + 6 \leq 0 \rightarrow (x-1)(x-6)$   
 $+ \quad - \quad +$   
 $D_f = [1, 6]$

الف)  $x^2 - 3x + 2 < 0$   
 $(x-1)(x-2)$

$+ \quad - \quad +$   
 $D_f = (-\infty, 1) \cup (2, +\infty)$

ب)  $\frac{x^2 - 1}{x^2 - 4x + 4} \geq 0 \rightarrow \frac{(x-1)(x+1)}{(x-2)^2}$

$- \quad + \quad - \quad +$   
 $D_f = (-\infty, -1] \cup (0, +\infty)$

الف)  $y = \sqrt{\frac{x^2 - 1}{x^2 + x + 1}}$   
 $(x-1)(x^2 + x + 1)$   
 $- \quad + \quad +$   
 $D_f = (-\infty, -1) \cup (0, 1) \cup (1, +\infty)$

ب)  $y = \sqrt{\frac{x^2 - 14}{x^2 - 8x + 15}}$   
 $- \quad + \quad +$   
 $D_f = (-\infty, -4] \cup (1, 4) \cup (5, +\infty)$

الف)  $y = \sqrt{4 - x} - \sqrt{x - 2}$

$\begin{cases} 4 - x \geq 0 \rightarrow x \leq 4 \\ x - 2 \geq 0 \rightarrow x \geq 2 \end{cases}$

$4 - \sqrt{x - 2} \geq 0 \rightarrow \sqrt{x - 2} \leq 4$

$x - 2 \leq 14 \rightarrow x \leq 16$

$D_f = [2, 16]$

ب)  $y = \sqrt{4 - x} - \sqrt{x - 2}$

$\begin{cases} 4 - x \geq 0 \rightarrow x \leq 4 \\ x - 2 \geq 0 \rightarrow x \geq 2 \end{cases}$

$4 - \sqrt{x - 2} \geq 0 \rightarrow \sqrt{x - 2} \leq 4$

$x - 2 \leq 9 \rightarrow x \leq 11$

$D_f = [2, 11]$

$$a) y = \sqrt{f - r|x|}$$

$$f - r|x| \geq 0 \rightarrow r|x| \leq f$$

$$\rightarrow |x| \leq \frac{f}{r} \rightarrow x \in [-\frac{f}{r}, \frac{f}{r}]$$

$$D_f = [-\frac{f}{r}, \frac{f}{r}]$$

$$b) y = \sqrt{r|x| - 9}$$

$$r|x| - 9 \geq 0 \rightarrow r|x| \geq 9$$

$$|x| \geq \frac{9}{r} \rightarrow x \leq -\frac{9}{r} \text{ or } x \geq \frac{9}{r}$$

$$D_f = (-\infty, -\frac{9}{r}] \cup [\frac{9}{r}, +\infty)$$

$$الف) y = r \sqrt{\frac{|x| + 1}{|x| - r}}$$

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

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

$$D_f = [0, +\infty) - \{\pm 9\}$$

$$الف) y = \frac{\sin x}{r \cos x - 1}$$

$$r \cos x \neq 1$$

$$\cos x \neq \frac{1}{r} \rightarrow x \neq \arccos(\frac{1}{r}), 2\pi - \arccos(\frac{1}{r})$$

$$ب) y = \frac{\tan x + r}{\cot x - 1}$$

$$D_f = \mathbb{R} - \{k\pi \pm \frac{\pi}{2}\}$$

$$y = \frac{\cos x + 1}{r \sin x + 1}$$

$$r \sin x \neq -1$$

$$\sin x \neq -\frac{1}{r} \rightarrow x \neq \arcsin(-\frac{1}{r}), \pi - \arcsin(-\frac{1}{r})$$

$$ج) y = \frac{\sin x + 1}{r \sin x - r}$$

$$D_f = \mathbb{R} - \{k\pi \pm \frac{\pi}{2}, k\pi \pm \frac{\pi}{r}\}$$

$$y = \sqrt{r|x - r| - \frac{1}{r}}$$

$$r|x - r| - \frac{1}{r} \geq 0 \rightarrow |x - r| \geq \frac{1}{r^2}$$

$$|x - r| \geq \frac{1}{r^2} \rightarrow x - r \geq \frac{1}{r^2} \rightarrow x \geq \frac{1}{r^2} + r$$

$$|x - r| \geq \frac{1}{r^2} \rightarrow x - r \leq -\frac{1}{r^2} \rightarrow x \leq r - \frac{1}{r^2}$$

$$D_f = (-\infty, r - \frac{1}{r^2}] \cup [\frac{1}{r^2} + r, +\infty)$$

$$الف) y = \sqrt{f - r|x|}$$

$$f - r|x| \geq 0$$

$$r|x| \leq f$$

$$|x| \leq \frac{f}{r} \rightarrow D_f = [-\frac{f}{r}, \frac{f}{r}]$$

$$ب) y = \sqrt{\frac{|x|}{|x|}}$$

$$x \neq 0$$

$$D_f = \mathbb{R} - \{0\}$$