



الف)  $x^2 - 4x + 4 \geq 0$   
 $(x-2)(x-2) \geq 0$   
 $D_f: (-\infty, 2] \cup [2, +\infty)$   
 $\frac{x}{+} \frac{2}{-} \frac{x}{+}$

ب)  $x^2 - 4x + 5 < 0$   
 $(x-1)(x-4) < 0$   
 $D_f: (1, 4)$   
 $\frac{x}{+} \frac{1}{-} \frac{4}{+} \frac{x}{+}$

ج)  $x^2 + 7x + 5 \geq 0$   
 $(x+3)(x+2) \geq 0$   
 $D_f: (-\infty, -3] \cup [-2, +\infty)$   
 $\frac{x}{+} \frac{-3}{-} \frac{-2}{+} \frac{x}{+}$

د)  $x^2 - 7x + 4 \leq 0$   
 $(x-1)(x-4) \leq 0$   
 $D_f: [1, 4]$   
 $\frac{x}{+} \frac{1}{-} \frac{4}{+} \frac{x}{+}$

الف)  $\frac{x^2 - 3x + 2}{x-4} < 0$   
 $(x-1)(x-2) < 0$   
 $D_f: (1, 2)$   
 $\frac{x}{-} \frac{1}{+} \frac{2}{-} \frac{x}{+}$

ب)  $\frac{x^2 - 1}{x^2 + 4x + 5} \geq 0$   
 $\frac{(x-1)(x+1)}{(x+1)(x-4)} \geq 0$   
 $D_f: (-\infty, -1] \cup (4, +\infty)$   
 $\frac{x}{+} \frac{-1}{-} \frac{4}{+} \frac{x}{+}$

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

ب)  $y = \sqrt{\frac{x^2 - 14}{x^2 - 4x + 4}}$   
 $\frac{x^2 - 14}{x^2 - 4x + 4} \geq 0$   
 $\frac{(x-4)(x+4)}{(x-2)(x-2)} \geq 0$   
 $D_f: (-\infty, -4] \cup (2, 4) \cup [4, +\infty)$

الف)  $y = \sqrt{x - \sqrt{x-2}}$   
 $\begin{cases} x - 2 \geq 0 \rightarrow x \geq 2 \\ x - \sqrt{x-2} \geq 0 \rightarrow \sqrt{x-2} \leq x - 2 \rightarrow x - 2 \leq 14 \rightarrow x \leq 16 \end{cases}$   
 $D_f: [2, 16]$

ب)  $y = \sqrt{x - \sqrt{x-2}}$   
 $\begin{cases} x - 2 \geq 0 \rightarrow x \geq 2 \\ x - \sqrt{x-2} \geq 0 \rightarrow \sqrt{x-2} \leq x - 2 \rightarrow x - 2 \leq 1 \rightarrow x \leq 3 \end{cases}$   
 $D_f: [2, 3]$

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|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| $1) y = \sqrt{2-x^2}$ $2-x^2 \geq 0 \rightarrow x^2 \leq 2 \rightarrow x \leq \sqrt{2}$ $-\sqrt{2} \leq x \leq \sqrt{2}$ $D_f = (-\infty, -\sqrt{2}] \cup \{\sqrt{2}\}$                                                                                                                                                                                                                      | $1) y = \sqrt{r x -9}$ $r x -9 \geq 0 \rightarrow r x  \geq 9 \rightarrow  x  \geq \frac{9}{r}$ $\rightarrow -\frac{9}{r} \leq x \leq \frac{9}{r}$ $D_f = [-\frac{9}{r}, \frac{9}{r}]$                        | 6  |
| $y = \sqrt{\frac{ x +1}{ x -r}}$ $ x -r \neq 0 \rightarrow  x  \neq r \rightarrow x \neq \pm r$ $D_f = \mathbb{R} - \{\pm r\}$                                                                                                                                                                                                                                                               | $1) y = \sqrt{\frac{\sqrt{x}+1}{\sqrt{x}-r}}$ $\sqrt{x}-r \neq 0 \rightarrow \sqrt{x} \neq r \rightarrow x \neq r^2$ $D_f = \mathbb{R} - \{r^2\}$                                                             | 7  |
| $1) y = \frac{\sin x}{r \cos x - 1}$ $r \cos x - 1 \neq 0$ $r \cos x \neq 1$ $\cos x \neq \frac{1}{r}$ $D_f = \mathbb{R} - \left\{ r k \pi + \frac{\arccos \frac{1}{r}}{r}, r k \pi + \frac{2\pi - \arccos \frac{1}{r}}{r} \right\}$                                                                                                                                                         | $1) y = \frac{\cos x + 1}{r \sin x + 1}$ $r \sin x + 1 \neq 0$ $\sin x \neq -\frac{1}{r}$ $D_f = \left\{ k \pi \pm \frac{\pi}{2} \right\}$                                                                    | 8  |
| $2) y = \frac{\tan x + r}{\cot x - 1}$ $\cot x \neq 1$ $\cos x \neq 0$ $D_f = \mathbb{R} - \left\{ k \pi + \frac{\pi}{2}, k \pi + \frac{3\pi}{2} \right\}$                                                                                                                                                                                                                                   | $3) y = \frac{\sin x + 1}{r \sin^2 x - r}$ $\sin^2 x \neq \frac{r}{r} \rightarrow \sin x \neq \pm \frac{\sqrt{r}}{r}$ $D_f = \mathbb{R} - \left\{ r k \pi + \frac{\pi}{2}, r k \pi + \frac{3\pi}{2} \right\}$ | 9  |
| $y = \frac{1}{\sqrt{r x-r  - \frac{1}{r}}}$ $r x-r  - \frac{1}{r} > 0 \rightarrow r x-r  > \frac{1}{r} \rightarrow  x-r  > \frac{1}{r^2} \Rightarrow \begin{cases} x-r > \frac{1}{r^2} \rightarrow x > r + \frac{1}{r^2} \\ x-r < -\frac{1}{r^2} \rightarrow x < r - \frac{1}{r^2} \end{cases}$ $D_f = \left( \frac{1}{r^2} + \infty \right) \cup \left( r - \frac{1}{r^2}, +\infty \right)$ |                                                                                                                                                                                                               | 9  |
| $1) y = \sqrt{1-r x }$ $1-r x  \geq 0 \rightarrow r x  \leq 1 \rightarrow  x  \leq \frac{1}{r}$ $-\frac{1}{r} \leq x \leq \frac{1}{r}$ $D_f = [-\frac{1}{r}, \frac{1}{r}]$                                                                                                                                                                                                                   | $1) y = \sqrt{\frac{ x }{ x }}$ $ x  \neq 0$ $D_f = \mathbb{R}^+ \subseteq \mathbb{R} - \{0\}$                                                                                                                | 10 |