

الف) $\frac{x^4 - 4x}{x^3 - x} > 0$ 1, 2, 5

$$\frac{x(x-4)}{(x+1)x(x-1)} > 0$$

نقطه ها: $-1, 0, 1, 4$

علامت ها: $- \quad + \quad + \quad - \quad +$

د = $(-\infty, -1) \cup (0, 1) \cup [4, +\infty)$

(-1, 0)

1

ب) $\frac{x^3 - x^2}{x^3 - x} > 0$ 1, 2, 5

$$\frac{x^2(x-1)}{x^2(x^2-1)} > 0$$

نقطه ها: $-1, 0, 1$

علامت ها: $+ \quad + \quad + \quad + \quad +$

د = $\{x \mid x > -1, x \neq 1\}$

الف) $\frac{x+1}{\sqrt{x+1}}$

$x+1 > 0 \Rightarrow x > -1$

$-x \leq 1 \Rightarrow x \geq -1$

$x < 0$
 $x+1 = x-x = 0$

$x > 0$
 $x+1 = x-x = 0$

د = $(0, +\infty)$

2

2 ✓

ب) $\frac{1}{\sqrt{x+1}}$ $x+1 > 0 \Rightarrow x > -1$

$x \neq 0$

د = $(0, +\infty)$

الف) $\sqrt{4-x} > 0$ $x > [x] \rightarrow x < 4$ $D = (-\infty, 4)$

2 ✓

ب) $\frac{1}{\sqrt{4-x}}$ $4-x > 0 \Rightarrow x < 4$ $D = (-\infty, 4)$

3

الف) $\sqrt{[x+\frac{1}{x}]} + [x+\frac{1}{x}] \geq 0$ $1 + [x-\frac{1}{x}] = [x+\frac{1}{x}]$ $[b+1] - [b] + 1$

$x - \frac{1}{x} \geq 0$ $[x - \frac{1}{x}] \geq 0$ $x - \frac{1}{x} \geq 0$ $D = [\frac{1}{x} + \infty)$

1, 2, 5

ب) $\sqrt{[x - \frac{1}{x}] + [-x + \frac{1}{x}]} > 0$ $b = x - \frac{1}{x}$ $D = \{ \frac{1}{x} \mid x \in \mathbb{Z} \}$

$x - \frac{1}{x} \in \mathbb{Z} \Rightarrow x \in \mathbb{Z} + \frac{1}{x}$

4

الف) $\frac{y}{\sin x - 1}$ $\sin x - 1 \neq 0$ $\sin x \neq 1$

$x = \frac{\pi}{2} + 2k\pi$

د = $\mathbb{R} - \{ \frac{\pi}{2} + 2k\pi \mid k \in \mathbb{Z} \}$

ب) $\frac{y}{y \sin^2 x - 1}$ 2 ✓

$y \sin^2 x - 1 \neq 0$ $y \sin^2 x \neq 1$

د = $\mathbb{R} - \{ \frac{\pi}{2} + \frac{k\pi}{2} \mid k \in \mathbb{Z} \}$

$\sin x \neq \frac{1}{\sqrt{y}}$ $\sin^2 x \neq \frac{1}{y}$ $x = \frac{\pi}{2} + \frac{k\pi}{2}$

5

$$\rightarrow) \sqrt{\sin x - 1} > 0$$

$$\sqrt{\sin x} \geq 1$$

$$\sin x \geq \frac{1}{4}$$

$$x \geq \frac{\pi}{6} + \frac{2k\pi}{4}$$

$$\frac{\pi}{4} \leq x \leq \frac{5\pi}{4}$$

$$D = \left[\frac{\pi}{4} + 2k\pi, \frac{5\pi}{4} + 2k\pi \right]$$

(1)

$$\rightarrow) \sqrt{\cos x - 1} > 0$$

$$\cos x \geq 1$$

$$D_y = f(x, y)$$

$$d = \left[-\frac{\pi}{2} + 2k\pi, \frac{\pi}{2} + 2k\pi \right] \quad k \in \mathbb{Z}$$

$$\cos y = |x| - 1$$

$$-1 \leq |x| - 1 \leq 1 \rightarrow 0 \leq |x| \leq 2 \rightarrow -2 \leq x \leq 2$$

$$D = [-2, -1] \cup [1, 2]$$

$$\begin{aligned} n^2 + n + 1 &\leq 1 \\ n^2 + n &\leq 0 \\ n(n+1) &\leq 0 \end{aligned}$$

$$D = [-2, -1] \cup [1, 2]$$

$$\rightarrow) \arcsin(n^2 + n + 1)$$

$$-1 \leq n^2 + n + 1 \leq 1$$

$$\begin{aligned} -1 &\leq n^2 + n + 1 \\ n^2 + n &\geq -2 \end{aligned}$$

$$\begin{aligned} n^2 + n + 1 &\geq -1 \\ n^2 + n &\geq -2 \end{aligned}$$

$$\begin{aligned} (n+1)(n+2) &\geq 0 \\ n \leq -2 \text{ or } n \geq -1 \end{aligned}$$

$$y = \sqrt{x - \log_2(n-x)}$$

$$\begin{aligned} n-x &> 0 \\ n &> x \end{aligned}$$

$$x - \log_2(n-x) > 0$$

$$\log_2(n-x) \leq x$$

$$n-x \leq 2^x$$

$$n-x \leq 9$$

$$n \leq 11$$

$$D = (2, 11]$$

$$\rightarrow) y = \log(n^2 - x)$$

$$n^2 - x > 0$$

$$n(n^2 - 1) > 0$$

$$n(n-1)(n+1) > 0$$

$$-1 < 0 < 1$$

$$D = (-1, 0) \cup (1, +\infty)$$

$$\frac{x}{f(x)}$$

$$f(x) \neq 0$$

$$f(x) \neq -1$$

$$D = \mathbb{R}$$

$$\frac{x}{f(x)-1}$$

$$f(x)-1 \neq 0$$

$$f(x) \neq 1$$

$$x \neq 0 \Rightarrow D = \mathbb{R} - \{0\}$$

$$\frac{x}{f(x)-2}$$

$$f(x)-2 \neq 0$$

$$f(x) \neq 2$$

$$x = \log f = \frac{1}{f} \Rightarrow D = \mathbb{R} - \left\{ \frac{1}{f} \right\}$$

$$\frac{x}{f(x)-3}$$

$$f(x)-3 \neq 0$$

$$f(x) \neq 3$$

$$x = \log f$$

$$D = \mathbb{R} - \{ \log f \}$$

$$\rightarrow) \frac{(n+1)!}{n!}$$

$$n+1 = n$$

$$D = \left\{ \frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \dots \right\}$$

$$n = \frac{k-1}{f}$$

$$D = \left\{ \frac{1}{f}, \frac{2}{f}, \frac{3}{f}, \dots \right\}$$

$$\rightarrow) \left(\frac{2n-2}{2n-1} \right)!$$

$$\frac{2n-2}{2n-1} = n$$

$$n = 0, 1, 2, 3, \dots$$

$$\begin{aligned} na - 2 &= n(na - 2) \\ 2n - 2 &= 2n(na - 2) \\ na(na - 2) &= 2n(na - 2) \\ na &= \frac{2n(na - 2)}{na - 2} \end{aligned}$$