

نام و نام خانوادگی تاریخ پاسخنامه تشریحی تکلیف شماره ۴ کلاس دبیر
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الف) $y = \frac{x+4}{x^3 - 10x^2 + 31x - 15}$ $\frac{x-1}{x^3 - 10x^2 + 31x - 15} = \frac{x-1}{(x-1)(x-5)(x-3)}$
 $\frac{x-1}{x^3 - 10x^2 + 31x - 15} = \frac{x-1}{(x-1)(x-5)(x-3)} \rightarrow D_f = \mathbb{R} - \{1, 3, 5\}$

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 $\frac{x+4}{x^3 - 10x^2 + 31x - 15} = \frac{x+4}{(x-1)(x-5)(x-3)} \rightarrow D_f = \mathbb{R} - \{1, 3, 5\}$

الف) $y = \frac{x+1}{x - \sqrt{3-2x}}$ $\sqrt{3-2x} \geq 0 \rightarrow 3-2x \geq 0 \rightarrow x \leq \frac{3}{2}$
 $x - \sqrt{3-2x} \neq 0 \rightarrow x \neq \sqrt{3-2x} \rightarrow x^2 = 3-2x \rightarrow x^2 + 2x - 3 \neq 0$
 $(x+3)(x-1) \neq 0 \rightarrow x \neq -3, x \neq 1$
 $D_f = (-\infty, \frac{3}{2}] - \{1, -3\}$

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 $(x+3)(x-1) \neq 0 \rightarrow x \neq -3, x \neq 1$
 $D_f = [\frac{3}{2}, +\infty) - \{1, -3\}$

الف) $y = \frac{\sin x}{\cos x - 1}$ $\cos x - 1 \neq 0 \rightarrow \cos x \neq 1 \rightarrow x \neq 2k\pi$
 $D_f = \mathbb{R} - \{2k\pi\}$

ب) $y = \frac{\cos x + 1}{\sin x + 1}$ $\sin x + 1 \neq 0 \rightarrow \sin x \neq -1 \rightarrow x \neq \frac{3\pi}{2} + 2k\pi$
 $D_f = \mathbb{R} - \{\frac{3\pi}{2} + 2k\pi\}$

ج) $y = \frac{\tan x + 1}{\cot x - 1}$ $\cot x - 1 \neq 0 \rightarrow \cot x \neq 1 \rightarrow x \neq \frac{\pi}{4} + k\pi$
 $D_f = \mathbb{R} - \{\frac{\pi}{4} + k\pi\}$

د) $y = \frac{\sin x + 1}{\cos x - 1}$ $\cos x - 1 \neq 0 \rightarrow \cos x \neq 1 \rightarrow x \neq 2k\pi$
 $D_f = \mathbb{R} - \{2k\pi\}$

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

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

ج) $x^2 + 4x + 5 > 0 \rightarrow (x+1)(x+5) > 0$ $\frac{-5}{x+1} - \frac{-1}{x+5} > 0$ $[-5, -1)$

د) $x^2 - 7x + 4 < 0 \rightarrow (x-1)(x-4) < 0$ $\frac{1}{x-1} - \frac{1}{x-4} < 0$ $(1, 4)$

الف) $\frac{x^2 - 3x + 2}{x - 5} < 0$ $\frac{(x-1)(x-2)}{x-5} < 0$ $\frac{1}{x-1} - \frac{1}{x-2} < \frac{1}{x-5}$ $(-\infty, 1) \cup (2, 5)$

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

$$a) y = \sqrt{\frac{x^2 - 4x + 3}{x^2 - 1}} \quad \frac{(x-1)(x-3)}{(x-1)(x^2+1)} > 0$$

 $\hookrightarrow x^2 - 1 \neq 0 \rightarrow x \neq \pm 1 \rightarrow x \neq 1$
 $\hookrightarrow \Delta = b^2 - 4ac = 16 - 12 = 4 \rightarrow x = 2$
 $D_f = [2, +\infty)$

$$b) y = \sqrt{\frac{x^2 - 4x + 3}{x^2 - 1}} \rightarrow x^2 - 1 \neq 0 \rightarrow x \neq \pm 1 \rightarrow x \neq \pm 1$$

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

$$a) y = \log(x^2 - 3x) \quad x^2 - 3x > 0 \rightarrow x(x-3) > 0 \quad D_f = (-\infty, 0) \cup (3, +\infty)$$

$$b) y = \log \frac{14 - x^2}{|x| - 2} \quad \begin{cases} 14 - x^2 > 0 \rightarrow x^2 < 14 \rightarrow -\sqrt{14} < x < \sqrt{14} \\ |x| - 2 > 0 \rightarrow |x| > 2 \rightarrow x > 2 \text{ or } x < -2 \end{cases}$$

 $D_f = (-\sqrt{14}, -2) \cup (2, \sqrt{14})$

$$c) y = \log \frac{x^2 - 5x + 4}{x - 3} \quad \frac{(x-4)(x-1)}{x-3} > 0 \quad D_f = (1, 3) \cup (4, +\infty)$$

$$d) y = \sqrt{x^2 - 11x + 18} + \log \frac{14 - x^2}{|x| - 2} \quad \begin{cases} x^2 - 11x + 18 \geq 0 \rightarrow (x-2)(x-9) \geq 0 \rightarrow x \leq 2 \text{ or } x \geq 9 \\ 14 - x^2 > 0 \rightarrow x^2 < 14 \rightarrow -\sqrt{14} < x < \sqrt{14} \\ |x| - 2 > 0 \rightarrow |x| > 2 \rightarrow x > 2 \text{ or } x < -2 \end{cases}$$

 $D_f = (0, 2] \cup [9, +\infty)$

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

x	-1	0	1
$x^2 - x$	+	+	-
$x^2 + x$	+	-	+
$y = \frac{x^2 - x}{x^2 + x}$	+	-	-

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

 $f(x) \neq 0 \rightarrow x = -2$
 $D_f = (-2, -1] \cup (1, 2]$

