

نام و نام خانوادگی مهديا حسيني پاسخنامه تشریحی تکلیف شماره ۴ کلاس دبیرستان
 (a+b)³ = a³ + 3a²b + 3ab² + b³

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 الف) $y = \frac{x+3}{3x^2-4x^2+31x-15} \rightarrow 3x^2-4x^2+31x-15 \neq 0 \rightarrow (x-1)(3x^2-14x+15) \neq 0$
 $\rightarrow x-1 \neq 0 \rightarrow x \neq 1$
 $\rightarrow 3x^2-14x+15 \neq 0 \rightarrow x \neq \frac{14 \pm \sqrt{196-180}}{6} = \frac{14 \pm 4}{6} \Rightarrow x \neq \frac{18}{6}, x \neq \frac{10}{6}$
 $\rightarrow x \neq 3, x \neq \frac{5}{3}$
 $D_f = \mathbb{R} - \{1, 3, \frac{5}{3}\}$
 ب) $y = \frac{x+3}{3x^2-4x^2+31x-15} \rightarrow 3x^2-4x^2+31x-15 \neq 0 \rightarrow (x+1)(3x^2-4x-15) \neq 0$
 $\rightarrow x+1 \neq 0 \rightarrow x \neq -1$
 $\rightarrow 3x^2-4x-15 \neq 0 \rightarrow x \neq \frac{4 \pm \sqrt{16+180}}{6} = \frac{4 \pm 14}{6} \Rightarrow x \neq \frac{18}{6}, x \neq \frac{-10}{6}$
 $\rightarrow x \neq 3, x \neq -\frac{5}{3}$
 $D_f = \mathbb{R} - \{-1, 3, -\frac{5}{3}\}$

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

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 الف) $y = \frac{\sin x}{2\cos x-1} \rightarrow 2\cos x-1 \neq 0 \rightarrow \cos x \neq \frac{1}{2} \rightarrow \bigcirc \rightarrow D_f = \mathbb{R} - \{2k\pi - \frac{\pi}{3}, 2k\pi + \frac{\pi}{3}\}$
 ب) $y = \frac{\cos x+1}{2\sin x+1} \rightarrow 2\sin x+1 \neq 0 \rightarrow \sin x \neq -\frac{1}{2} \rightarrow \bigcirc \rightarrow D_f = \mathbb{R} - \{2k\pi + \frac{7\pi}{6}, 2k\pi - \frac{\pi}{6}\}$
 ج) $y = \frac{\tan x+2}{\cot x-1} \rightarrow \cot x-1 \neq 0 \rightarrow \cot x \neq 1 \rightarrow \tan x \neq \frac{1}{\cot x} \rightarrow \tan x \neq \frac{\sin x}{\cos x} \rightarrow \cos x \neq 0 \rightarrow \bigcirc \rightarrow D_f = \mathbb{R} - \{k\pi + \frac{\pi}{2}, k\pi, k\pi + \frac{3\pi}{2}\}$
 د) $y = \frac{\sin x+1}{2\sin^2 x-3} \rightarrow 2\sin^2 x-3 \neq 0 \rightarrow \sin^2 x \neq \frac{3}{2} \rightarrow \sin x \neq \pm \frac{\sqrt{6}}{2} \rightarrow \bigcirc \rightarrow D_f = \mathbb{R} - \{k\pi + \frac{\pi}{3}, k\pi + \frac{2\pi}{3}\}$

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 الف) $x^2-5x+4 > 0 \rightarrow (x-1)(x-4) > 0 \rightarrow \frac{1}{+} \frac{-}{-} \frac{+}{+} \rightarrow D_f = (-\infty, 1) \cup (4, +\infty)$
 ب) $x^2-4x+5 < 0 \rightarrow (x-1)(x-5) < 0 \rightarrow \frac{1}{+} \frac{-}{-} \frac{+}{+} \rightarrow D_f = (1, 5)$
 ج) $x^2+4x+5 \geq 0 \rightarrow (x+1)(x+5) \geq 0 \rightarrow \frac{-}{+} \frac{-}{-} \frac{+}{+} \rightarrow D_f = (-\infty, -5] \cup [-1, +\infty)$
 د) $x^2-4x+4 \leq 0 \rightarrow (x-1)(x-4) \leq 0 \rightarrow \frac{1}{+} \frac{-}{-} \frac{+}{+} \rightarrow D_f = [1, 4]$

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 الف) $\frac{x^2-3x+2}{x-5} < 0 \rightarrow \frac{(x-1)(x-2)}{x-5} < 0 \rightarrow \frac{1}{-} \frac{+}{-} \frac{-}{-} \frac{+}{+} \rightarrow D_f = (-\infty, 1) \cup (2, 5)$
 ب) $\frac{x^2-1}{x^2-4x+5} \geq 0 \rightarrow \frac{(x-1)(x+1)}{(x-1)(x-5)} \geq 0 \rightarrow \frac{1}{+} \frac{-}{-} \frac{+}{+} \frac{+}{+} \rightarrow D_f = (-\infty, -1] \cup (5, +\infty)$

$$\text{ا) } y = \sqrt{\frac{x^2 - 4x + 4}{x^2 - 1}} \rightarrow \frac{(x-1)(x-2)}{x^2 - 1} \geq 0 \rightarrow \frac{1}{x-1} \geq 0 \rightarrow D_f = [1, +\infty)$$

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$$\text{ب) } y = \sqrt{\frac{x^2 - 4x + 4}{x^2 - 1}} \rightarrow x^2 - 1 \neq 0 \rightarrow x^2 \neq 1 \rightarrow x \neq \pm 1 \rightarrow D_f = \mathbb{R} - \{\pm 1\}$$

$$\text{ا) } y = \log(x^2 - 3x) \rightarrow x^2 - 3x > 0 \rightarrow x(x-3) > 0 \rightarrow \frac{0}{+|-|-|+} \rightarrow D_f = (-\infty, 0) \cup (3, +\infty)$$

$$\text{ب) } y = \log_{|x|-2}^{14-x^2} \rightarrow \begin{cases} 14-x^2 > 0 \rightarrow 14 > x^2 \rightarrow x > -\sqrt{14} \text{ and } x < \sqrt{14} \\ |x|-2 > 0 \rightarrow |x| > 2 \rightarrow x > 2 \text{ or } x < -2 \\ |x|-2 \neq 1 \rightarrow |x| \neq 3 \rightarrow x \neq \pm 3 \end{cases} \rightarrow D_f = (-\sqrt{14}, -2) \cup (2, \sqrt{14}) - \{\pm 3\}$$

$$\text{ج) } y = \log_{10-x}^{\frac{x^2-4x+4}{x^2-1}} \rightarrow \begin{cases} 10-x > 0 \rightarrow x < 10 \\ 10-x \neq 1 \rightarrow x \neq 9 \\ \frac{x^2-4x+4}{x^2-1} > 0 \rightarrow \frac{(x-2)^2}{(x-1)(x+1)} > 0 \rightarrow x > 1 \text{ or } x < -1 \end{cases} \rightarrow D_f = (1, 10) - \{9\}$$

$$\text{د) } y = \sqrt{x^2 - 11x + 28} + \log_{\sqrt{3x-x^2}} \rightarrow \begin{cases} x^2 - 11x + 28 \geq 0 \rightarrow (x-4)(x-7) \geq 0 \rightarrow x \leq 4 \text{ or } x \geq 7 \\ \sqrt{3x-x^2} > 0 \rightarrow 3x-x^2 > 0 \rightarrow x > 0 \text{ and } x < 3 \end{cases} \rightarrow D_f = (0, 4] \cup [7, +\infty)$$

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

مشتق اول:

	-1	0	1
$x^2 - x$	+	+	-
$x^2 + x$	+	-	+

مشتق دوم:

	-1	0	1
	+	-	+

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$$y = \sqrt{\frac{x-f(x)}{f(x)}} \rightarrow \frac{x-f(x)}{f(x)} \geq 0 \Rightarrow D_f = (-1, -1] \cup (1, 3]$$

	-2	-1	1	3
$x-f(x)$	-	-	+	+
$f(x)$	+	-	-	+

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ا) $f(x)+1$

ب) $f(x-1)$

ج) $-f(x)$

د) $f(x+1)+2$

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