تکلیف شماره ۶

مریم اسدی زاده _ کلاس دهم A

۱) دامنه

الف) $\dfrac{x+4}{4x^3-20x^2+31x-15} \Rightarrow$ مخرج $\neq 0 \Rightarrow$

$4x^3-20x^2+31x-15 \neq 0$

$(x-1)(2x-3)(2x-5) \neq 0$

$x \neq 1 , \frac{3}{2} , \frac{5}{2}$

$D_f = \mathbb{R} - \left\{1 , \frac{3}{2} , \frac{5}{2}\right\}$

ب) $\dfrac{x+3}{3x^3-x^2-8x-4} \Rightarrow 3x^3-x^2-8x-4 \neq 0 \Rightarrow x \neq 2 , -1 , -\frac{2}{3}$

$(x+1)(x-2)(3x+2) = 0$

$D_f = \mathbb{R} - \left\{2 , -1 , -\frac{2}{3}\right\}$

۲)

الف) $y = \dfrac{x+1}{x-\sqrt{3-2x}}$ ⓵ ⓶ $\Rightarrow$

⓵ $\rightarrow 3-2x \geq 0 \Rightarrow 3 \geq 2x$, $x \leq \frac{3}{2}$

⓶ $\rightarrow x-\sqrt{3-2x} \neq 0 \Rightarrow (x)^2 \neq (\sqrt{3-2x})^2$

$x^2 \neq 3-2x \Rightarrow x^2+2x-3 \neq 0$

$(x-1)(x+3) \neq 0$

$x \neq 1 , -3$

⓵ ∩ ⓶ : $D_f = (-\infty , \frac{3}{2}] - \{1 , -3\}$

ب) $y = \dfrac{x+2}{x-\sqrt{3x-2}}$

⓵ $\rightarrow 3x-2 \geq 0$, $3x \geq 2$, $x \geq \frac{2}{3}$

⓶ $\rightarrow x-\sqrt{3x-2} \neq 0$

$x \neq \sqrt{3x-2} \Rightarrow x^2 \neq 3x-2 \Rightarrow$

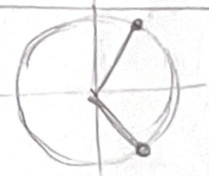
$x^2-3x+2 \neq 0$

$x \neq 1 , 2 \leftarrow (x-2)(x-1) \neq 0$

⓵ ∩ ⓶ : $D_f = [\frac{2}{3} , +\infty) - \{1 , 2\}$

۳)

الف) $y = \dfrac{\sin x}{2\cos x - 1}$



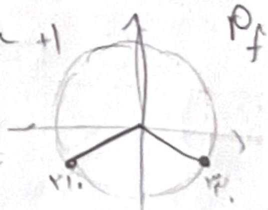
$2\cos x - 1 \neq 0$

$\cos x \neq \frac{1}{2} \Rightarrow D_f = \mathbb{R} - \left\{2k\pi \pm \frac{\pi}{3}\right\}$

ب) $\dfrac{\cos x + 1}{2\sin x + 1}$

$2\sin x + 1 \neq 0$

$\sin x \neq -\frac{1}{2}$



$D_f = \mathbb{R} - \left\{2k\pi + \frac{7\pi}{6} , 2k\pi - \frac{\pi}{6}\right\}$

ج) $\dfrac{\tan x + 2}{\cot x - 1}$ ⓵ ⓶ ⓷ $\Rightarrow$

⓵ $\Rightarrow \cos x \neq 0 \Rightarrow x \neq \frac{\pi}{2} + k\pi$

⓶ $\Rightarrow \sin x \neq 0 \Rightarrow x \neq k\pi$

⓷ $\rightarrow \cot x - 1 \neq 0 \Rightarrow \cot x \neq 1$

$x \neq k\pi + \frac{\pi}{4}$

$D_f = \mathbb{R} - \left\{k\pi , k\pi + \frac{\pi}{2} , k\pi + \frac{\pi}{4}\right\}$

د) $\dfrac{\sin x + 1}{4\sin^2 x - 3}$

$4\sin^2 x - 3 \neq 0$

$\sin x \neq \pm\frac{\sqrt{3}}{2}$

$D_f = \mathbb{R} - \left\{k\pi + \frac{\pi}{3} , k\pi + \frac{2\pi}{3}\right\}$

۴)

الف) $x^2 - 5x + 6 > 0$

$(x-3)(x-2) > 0$

(2, 3: + | − | +)

$D_f = (-\infty , 2) \cup (3 , +\infty)$

ب) $x^2 - 6x + 5 < 0$

$(x-1)(x-5) < 0 \Rightarrow D_f = (1 , 5)$

(1, 5: + | − | +)

ج) $x^2 + 6x + 5 \geq 0$

$(x+1)(x+5) \geq 0 \Rightarrow D_f = (-\infty , -5] \cup [-1 , +\infty)$

(−5, −1: + | − | +)

د) $x^2 - 7x + 6 \leq 0$

$(x-1)(x-6) \leq 0$

(1, 6: + | − | +)

$D_f = [1 , 6]$

۵)

الف) $\frac{x^2-3x+2}{x-5} \geq 0$

$\frac{(x-2)(x-1)}{x-5} \leq 0 \Rightarrow$ 1 2 5: $- \mid + \mid - \mid +$ $\Rightarrow D_f=(-\infty,1]\cup[2,5)$

ب) $-\frac{(x-1)(x+1)}{(x-1)(x-5)} \geq 0$; −1 1* 5: $+ \mid - \mid - \mid +$ $\Rightarrow D_f=(-\infty,-1]\cup(5,+\infty)$

۶)

الف) $\sqrt{\frac{(x-3)(x-1)}{(x-1)(x^2+1+2x)}} \Rightarrow$ 1* 3: $- \mid - \mid +$ $\Rightarrow D_f=[3,+\infty)$

(x^2+1+2x: همواره مثبت)

ب) $y=\sqrt[3]{\frac{x^2-4x+3}{x^2-1}}$ = فرد = $D_f=\mathbb{R}-\{\pm1\}$

$x^2-1\neq 0$

$x^2\neq 1 \quad x\neq \pm 1$

۷)

الف) $y=\log(x^2-3x)$; 0 3: $+ \mid - \mid +$

$x^2-3x>0 \Rightarrow x(x-3)>0 \Rightarrow D_f=(-\infty,0)\cup(3,+\infty)$

ب) $y=\log_{|x|-2}(16-x^2)$

① $\Rightarrow 16-x^2>0 \Rightarrow x^2<16$, $-4<x<4$

② $\rightarrow |x|-2>0 \Rightarrow x>2$, $x<-2$

$D_f=①\cap② \Rightarrow (-4,-2)\cup(2,4)$

ج) $y=\log_{10-x}\frac{x^2-7x+12}{x-3}$; ①∩② $= D_f=(4,10)$

① $\rightarrow \frac{(x-3)(x-4)}{x-3}>0$; 3* 4: $- \mid - \mid +$ $\Rightarrow (4,+\infty)$

② $10-x>0 \Rightarrow x<10$

د) $y=\sqrt{x^2-11x+28}+\log_x\sqrt{36-x^2}$

① $\rightarrow \sqrt{36-x^2}>0$

$36-x^2>0$

$x^2<36 \rightarrow -6<x<6$

② $\rightarrow x>0$

③ $\rightarrow (x-7)(x-4)\geq 0$; 4 7: $+ \mid - \mid +$

$(-\infty,4]\cup[7,+\infty)$

①∩②∩③ $D_f=(0,4)$

۸)

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

		−1	0	1
x^2-x	+	+	−	+
x^2+x	+	−	+	+
$P(x)$	+	∅ −	∅ −	+

−1 0* 1: $+ \mid - \mid - \mid +$

$\Rightarrow (-\infty,-1)\cup[1,+\infty) \geq 0$

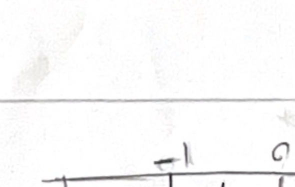
$(-1,0)\cup(0,1] \leq 0$

۹)

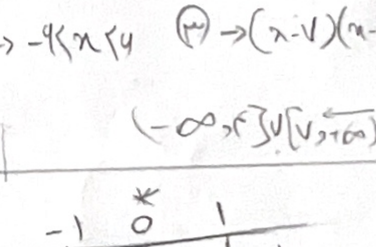
$y=\sqrt{\frac{x-f(x)}{f(x)}}$; −2 −1 2 3: $+ \mid - \mid + \mid - \mid +$ $\Rightarrow D_f=(-\infty,-2)\cup[-1,2)\cup[3,+\infty)$

۱۰)

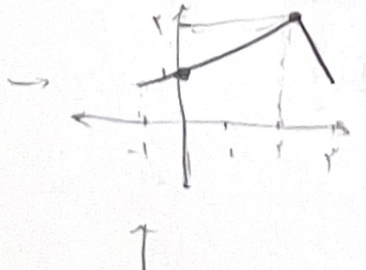
الف) $f(x)+1 \rightarrow$



ب) $f(x-1)$



ج) $-f(x)$



د) $f(x+1)+1$