

نام و نام خانوادگی: امیرحسین حصصی... پاسخنامه تشریحی تکلیف شماره ۴... کلاس: چهارم دبیر... B...

الف) $y = \sqrt{\frac{x^2 - 4x}{x^3 - x}} = \sqrt{\frac{x(x-4)}{x(x-1)(x+1)}} \Rightarrow Df = (-1, 1) \cup [4, +\infty) - \{0\}$

x	-1	0	1	4
f(x)	-	+	+	-
	0	0	0	0

ب) $y = \sqrt{\frac{x^5 - x^3}{x^3 - x}} = \sqrt{\frac{x^3(x+1)(x-1)}{x(x+1)(x-1)}} \Rightarrow Df = \mathbb{R} - \{-1, 1\}$

الف) $y = \frac{x+1}{\sqrt{x+|x|}} \xrightarrow{x=-1 \Rightarrow \text{مخرج} = 0} \frac{x}{\sqrt{x+|x|}} \xrightarrow{x > 0} \frac{x}{\sqrt{2x}} \Rightarrow Df = (0, +\infty)$

$x+|x| > 0 \Rightarrow x > 0$

ب) $y = \frac{1}{\sqrt{x|x|}} \xrightarrow{x > 0} \frac{1}{\sqrt{x^2}} \Rightarrow Df = (0, +\infty)$

if $x=0$ تعریف نشده $x > 0$ تعریف شده $x < 0$ تعریف نشده $\Rightarrow Df = (0, +\infty)$

الف) $y = \sqrt{2-[x]} \Rightarrow 2-[x] \geq 0 \Rightarrow 2 \geq [x] \Rightarrow 3 > x \Rightarrow Df = (-\infty, 3)$

ب) $y = \frac{1}{\sqrt{2-[x]}} \Rightarrow 2-[x] > 0 \Rightarrow 2 > [x] \Rightarrow 2 > x \Rightarrow Df = (-\infty, 2)$

الف) $y = \sqrt{[x-\frac{1}{4}] + [x+\frac{1}{4}]} \Rightarrow [x+\frac{1}{4}] = [x-\frac{1}{4}] + 1$

$2[x-\frac{1}{4}] + 1 \geq 0 \Rightarrow [x-\frac{1}{4}] \geq -\frac{1}{2} \Rightarrow [x-\frac{1}{4}] \geq 0 \Rightarrow x-\frac{1}{4} \geq 0$

$\Rightarrow x \geq \frac{1}{4} \Rightarrow Df = [\frac{1}{4}, +\infty)$

ب) $y = \sqrt{[x-\frac{1}{4}] + [-x+\frac{1}{4}]} = \sqrt{[a] + [-a]} \Rightarrow [a] + [-a] \geq 0 \Rightarrow \begin{cases} a \in \mathbb{Z} \Rightarrow [a] + [-a] = 0 \\ a \notin \mathbb{Z} \Rightarrow [a] + [-a] < 0 \end{cases}$

$\rightarrow x - \frac{1}{4} = k \Rightarrow x = k + \frac{1}{4} \Rightarrow Df = \{x | x = k + \frac{1}{4}, k \in \mathbb{Z}\}$

الف) $y = \frac{2}{\sin x - 1} \quad \sin x \neq 1 \Rightarrow x \neq 2k\pi + \frac{\pi}{2}$

$Df = \mathbb{R} - \{2k\pi + \frac{\pi}{2} | k \in \mathbb{W}\}$

ب) $y = \frac{2}{2\sin^2 x - 1} \Rightarrow 2\sin^2 x \neq 1 \Rightarrow \sin^2 x \neq \frac{1}{2} \Rightarrow \sin x \neq \pm \frac{1}{\sqrt{2}}$

$\Rightarrow x \neq \frac{k\pi}{2} + \frac{\pi}{4} \Rightarrow Df = \mathbb{R} - \{\frac{k\pi}{2} + \frac{\pi}{4} | k \in \mathbb{W}\}$

$$a) y = \sqrt{2 \sin x - 1} \Rightarrow 2 \sin x \geq 1 \Rightarrow \sin x \geq \frac{1}{2} \Rightarrow x = \left[2k\pi + \frac{\pi}{6}, 2k\pi + \frac{5\pi}{6} \right]$$

$$\Rightarrow Df = \left[2k\pi + \frac{\pi}{6}, 2k\pi + \frac{5\pi}{6} \right]$$

$$b) \sqrt{\cos x - 1} \Rightarrow \cos x \geq 1 \Rightarrow x = \{2k\pi\}$$

$$Df = \{2k\pi\}$$

$$a) \cos y = |x| - 3 \quad -1 \leq |x| - 3 \leq 1 \Rightarrow 2 \leq |x| \leq 4 \Rightarrow \begin{cases} 2 \leq x \leq 4 \\ -4 \leq x \leq -2 \end{cases}$$

$$Df = [-4, -2] \cup [2, 4]$$

$$b) y = \arcsin(x^2 + 3x + 1) \quad -1 \leq x^2 + 3x + 1 \leq 1 \Rightarrow \begin{cases} x^2 + 3x + 1 \leq 1 \Rightarrow x^2 + 3x \leq 0 \Rightarrow x(x+3) \leq 0 \\ x^2 + 3x + 1 \geq -1 \Rightarrow x^2 + 3x + 2 \geq 0 \Rightarrow (x+1)(x+2) \geq 0 \end{cases}$$

$$Df = [-3, -2] \cup [-1, 0]$$

$$a) y = \sqrt{2 - \log_2(x-2)} \quad x-2 > 0 \Rightarrow x > 2 \Rightarrow 2 - \log_2(x-2) \geq 0 \Rightarrow 2 \geq \log_2(x-2) \Rightarrow x-2 \leq 4 \Rightarrow x \leq 6$$

$$Df = (2, 6]$$

$$b) y = \log_2(x^3 - x) \quad x^3 - x > 0 \Rightarrow x(x^2 - 1) > 0 \Rightarrow x(x-1)(x+1) > 0 \Rightarrow x > 1 \text{ or } x < -1$$

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

$$a) y = \frac{2}{2^x - 1} \quad 2^x \neq 1 \Rightarrow x \neq 0$$

$$Df = \mathbb{R}$$

$$b) y = \frac{2}{2^x - 1} \quad 2^x - 1 \neq 0 \Rightarrow 2^x \neq 1 \Rightarrow x \neq 0$$

$$Df = \mathbb{R} - \{0\}$$

$$c) y = \frac{2}{2^x - 2} \quad 2^x - 2 \neq 0 \Rightarrow 2^x \neq 2 \Rightarrow x \neq 1$$

$$Df = \mathbb{R} - \{1\}$$

$$d) y = \frac{2}{2^x - 3} \quad 2^x - 3 \neq 0 \Rightarrow 2^x \neq 3 \Rightarrow x \neq \log_2 3$$

$$Df = \mathbb{R} - \{\log_2 3\}$$

$$a) y = (fx+1)! \quad k \in \mathbb{W}$$

$$fx+1 = k \Rightarrow$$

$$fx = k-1 \Rightarrow$$

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

$$Df = \left\{ x \mid x = \frac{k-1}{f}, k \in \mathbb{W} \right\}$$

$$b) y = \left(\frac{2^x - 2}{2^x - 3} \right)! \quad k \in \mathbb{W}$$

$$\frac{2^x - 2}{2^x - 3} = k \Rightarrow$$

$$2^x - 2 = 2^k x - 3k \Rightarrow$$

$$2^x - 2^k x = -3k + 2 \Rightarrow$$

$$(2^k - 2)x = 3k - 2$$

$$x = \frac{3k-2}{2^k-2}$$

$$Df = \left\{ x \mid x = \frac{3k-2}{2^k-2}, k \in \mathbb{W} \right\}$$