

سوال ۱۹، ۱۷، ۱۵

الف) $\frac{x+3}{(x-1)(x^2-14x+40)} \Rightarrow \frac{x+3}{(x-1)(x-4)(x-10)} \Rightarrow \frac{(x+1)(x-4)(x-10)}{(x-1)(x-4)(x-10)} \neq 0$

$D_f = \mathbb{R} - \left\{ 1, \frac{4}{3}, \frac{1}{2} \right\}$ $\checkmark$ $\frac{x^2-14x+40}{(x-4)(x-10)}$

ب) $\frac{x+3}{x^3-x^2-18x-8} \Rightarrow \frac{x+3}{(x+1)(x-4)(x+2)} \Rightarrow \frac{(x+1)(x-4)(x+2)}{(x+1)(x-4)(x+2)} \neq 0$

$D_f = \mathbb{R} - \left\{ -1, 2, -\frac{1}{2} \right\}$ $\checkmark$ $\frac{x^2-4x-12}{(x-6)(x+2)}$

الف) $x-2m \geq 0 \rightarrow \frac{x}{2} \geq m$ $x = \frac{4}{3}$ $x = -\frac{2}{3}$ سوال 2

$x - \sqrt{x-2m} \neq 0 \rightarrow x \neq \sqrt{x-2m} \rightarrow x^2 \neq x-2m \rightarrow x^2+x-3 \neq 0 \rightarrow$

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

ب) $\sqrt{x-2} \geq 0 \rightarrow x-2 \geq 0 \rightarrow x \geq \frac{2}{3}$

$x - \sqrt{x-2} \neq 0 \Rightarrow x \neq \sqrt{x-2} \Rightarrow x^2 \neq x-2 \rightarrow x^2-x+2 \neq 0 \rightarrow (x-1)(x-2) \neq 0 \Rightarrow x \neq 1, 2$

$D_f = [\frac{2}{3}, \infty) - \{1, 2\}$

الف) $r \cos m \neq 1 \Rightarrow \cos m \neq \frac{1}{r}$

$\Rightarrow D_f = \mathbb{R} - \left\{ 2k\pi + \frac{\pi}{3}, 2k\pi + \frac{5\pi}{3} \right\}$

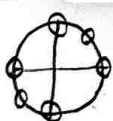


ب) $r \sin m \neq -1 \Rightarrow \sin m \neq -\frac{1}{r}$

$\Rightarrow D_f = \mathbb{R} - \left\{ 2k\pi + \frac{\pi}{4}, 2k\pi + \frac{5\pi}{4} \right\}$



ج) $\cot m \neq 1, \sin m \neq 0 \Rightarrow D_f = \mathbb{R} - \left\{ k\pi, k\pi + \frac{\pi}{4} \right\}$



د) $r \sin^2 m \neq 3 \Rightarrow \sin^2 m \neq \frac{3}{r} \Rightarrow \sin m \neq \pm \sqrt{\frac{3}{r}} \Rightarrow D_f = \mathbb{R} - \left\{ k\pi + \frac{\pi}{3}, k\pi - \frac{\pi}{3} \right\}$



الف) $(x-2)(x-3) > 0 \rightarrow \frac{2}{x-2} + \frac{3}{x-3} \rightarrow (-\infty, 2) \cup (3, \infty)$

ج) $(x+1)(x+5) \geq 0 \rightarrow \frac{-5}{x+1} - \frac{1}{x+5} = (-\infty, -5] \cup [-1, \infty)$

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

د) $(x-1)(x-4) \leq 0 \rightarrow \frac{1}{x-1} - \frac{4}{x-4} = [1, 4]$

ج) $(x+1)(x+5) \geq 0 \rightarrow \frac{-5}{x+1} - \frac{1}{x+5} \rightarrow (-\infty, -5] \cup [-1, \infty)$

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

ب) $\frac{(x-1)(x+1)}{(x-1)(x-5)} \geq 0 \rightarrow \frac{-1}{x-1} - \frac{1}{x-5} \rightarrow (-\infty, -1] \cup (5, \infty)$

$$y = \frac{(x-1)(x-3)}{(x-1)(x^2+m+1)} \Rightarrow \frac{(x-1)(x-3)}{(x-1)} \geq 0 \cdot \frac{1}{x^2+m+1} \Rightarrow [3, \infty) = D_f$$

سوال ۲

$$y = \frac{(x-1)(x-3)}{(x-1)(x+1)} \Rightarrow x \neq \pm 1 \Rightarrow D_f: \mathbb{R} - \{\pm 1\}$$

$$1) \log^{x^2-3x} \rightarrow x^2-3x > 0 \rightarrow x(x-3) > 0 \rightarrow \frac{x}{x-3} > 0 \rightarrow (-\infty, 0) \cup (3, \infty)$$

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$$2) (x-m)(x+m) > 0 \rightarrow -\frac{x}{x+m} < 0 \rightarrow (-x, x) \text{ I و } |x-2| > 0 \rightarrow |x| > 2 \Rightarrow x < -2 \text{ II, } |x+2| > 0 \Rightarrow x > -2 \text{ III}$$

$x \neq \pm 2$

$$\Rightarrow D_f: (-x, -2) - \{-2\} \cup (2, x) - \{2\} / (-2, 2) \cup (2, x) - \{\pm 2\}$$

$$2) 1-x \neq 1, 1-x > 0 \rightarrow x < 0, x \neq 1 \Rightarrow \frac{(x-3)(x-4)}{x-3} > 0 \rightarrow \frac{x}{x-3} > 0 \rightarrow (x, \infty)$$

$$\Rightarrow D_f: (x, 1) - \{1\}$$

$$3) (x-x)(x-y) > 0 \rightarrow \frac{x}{x-y} > 0 \rightarrow (-\infty, x] \cup [y, \infty) \} x > 0, x \neq 1, (4-x)(4+x) > 0 \rightarrow \frac{-x}{-x+4} > 0 \rightarrow (-4, 4)$$

$$\Rightarrow D_f: (0, x] - \{1\} \cup (y, \infty)$$

$$ع ۳ \Rightarrow \frac{x(x-1)}{x(x+1)} \Rightarrow \frac{-1}{x+1} > 0$$

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	-1	0	1
$x(x-1)$	+	+	-
$x(x+1)$	+	-	+
P	+	-	+

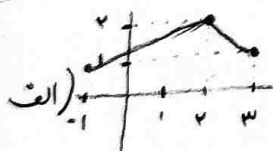
$$f(x) \neq 0 \Rightarrow x \neq -2, 3$$

$$x - f(x) = 0 \rightarrow x = f(x) \Rightarrow x = -1$$

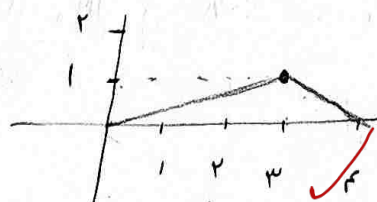
$$\Rightarrow D_f: [-2, -1] \cup (2, 3]$$

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$$D_f: [-2, -1] \cup (2, 3]$$



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