

الف) $y = \frac{x+3}{2x^3+3x^2-11x+3} = \frac{x+3}{(x-1)(2x^2+5x-3)} = \frac{(x+3)}{(x-1)(2x-1)(x+3)} \quad Df = \mathbb{R} - \left\{1, \frac{1}{2}, -3\right\}$

ب) $y = \frac{x+3}{2x^3+9x^2+10x+3} = \frac{x+3}{(x+1)(2x+1)(x+3)} \Rightarrow Df = \mathbb{R} - \left\{-1, -\frac{1}{2}, -3\right\}$

الف) $y = \frac{x+3}{x^3-2x^2+2x-1} = \frac{(x+3)}{(x-1)(x^2-x+1)} \Rightarrow Df = \mathbb{R} - \{1\}$
 ریشه ندارد

ب) $y = \sqrt{\frac{x+3}{x^3-2x^2+2x-1}} = \sqrt{\frac{x+3}{(x-1)(x^2-x+1)}} \Rightarrow \frac{-3}{+\infty-\infty+} \quad Df = (-\infty, -3] \cup (1, +\infty)$
 همواره مثبت و ریشه ندارد

$y = \frac{2}{x^2-5|x-1|-2x+5}$

(I) $\cup$ (II)

$\Rightarrow Df = \mathbb{R} - \{-2, 0, 2, 5\}$

$\frac{2}{x^2+3x} = \frac{2}{x(x+3)}$ $\Rightarrow x \neq 0$ $x \neq -3 \quad x < 1$ $\Rightarrow x \neq \{0, -3\} \quad (I)$	$\frac{2}{x^2-7x+10} = \frac{2}{(x-2)(x-5)}$ $\Rightarrow x \neq 2$ $x \neq 5 \quad x > 1$ $\Rightarrow x \neq \{2, 5\} \quad (II)$
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الف) $y = \frac{x+3}{|2x+1| - |x+3|} \rightarrow$

(I) $\cup$ (II) $\cup$ (III)

$\Rightarrow Df = \mathbb{R} - \left\{-\frac{2}{3}, 2\right\}$

$\frac{-3}{-2x-1+x+3} = -2x-2$ $\Rightarrow x \neq 2$ $x < 3 \quad \Rightarrow \mathbb{Q} \quad (I)$	$\frac{-1}{-2x-1-x-3} = -2x-4$ $\Rightarrow x \neq -\frac{1}{2}$ $-2 < x < -\frac{1}{2} \Rightarrow x \neq -\frac{1}{2} \quad (II)$	$\frac{-1}{2x+1-x-3} = 2x-2$ $\Rightarrow x \neq 2$ $x > -\frac{1}{2} \Rightarrow x \neq 2 \quad (III)$
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الف) $y = \log_y(1 - \log_x x) \rightarrow x > 0 \quad (I)$

(I) $\cap$ (II)

$\Rightarrow 0 < x < 3 \Rightarrow Df = (0, 3)$

$1 - \log_x x > 0 \Rightarrow \log_x x < 1 \Rightarrow x < 3 \quad (II)$

ب) $y = \log_y(1 - \log_{\frac{1}{x}} x) \rightarrow x > 0 \quad (I)$

$1 - \log_{\frac{1}{x}} x > 0 \Rightarrow \log_{\frac{1}{x}} x < 1 \Rightarrow \frac{1}{x} < x \quad (II)$

(I) $\cap$ (II) $\Rightarrow Df = (\frac{1}{x}) + \infty$

سوال ۴ ب) $y = \sqrt{|2x+1| - |x+3|} \rightarrow |2x+1| - |x+3| \geq 0 \Rightarrow |2x+1| \geq |x+3|$
 $\Rightarrow (2x+1)^2 \geq (x+3)^2 \Rightarrow 4x^2+4x+1 \geq x^2+6x+9 \Rightarrow 3x^2-2x-8 \geq 0$
 $\Rightarrow (x-2)(3x+4) \geq 0 \Rightarrow \frac{-4}{3} \leq x \leq 2$
 $Df = [-\infty, \frac{-4}{3}] \cup [2, +\infty)$

$$f(x) = \sqrt{\log_{\log_{\omega}}(2x-1)}$$

$$2x-1 > 0 \Rightarrow x > \frac{1}{2} \quad (I)$$

$$\Rightarrow \log_{\omega}^{(2x-1)} > 0 \Rightarrow 2x-1 \leq \omega \Rightarrow x \leq 3 \quad (II)$$

$$2x-1 > 1 \Rightarrow x > 1 \quad (III)$$

$$(I) \cap (II) \cap (III) \Rightarrow D_f = (1, 3]$$

الف) $y = \log(2\cos x + 1) \rightarrow 2\cos x + 1 > 0 \Rightarrow \cos x > -\frac{1}{2}$



$$D_f = (2k\pi - \frac{\pi}{3}, 2k\pi + \frac{\pi}{3})$$

ب) $y = \sqrt{\log \frac{x-1}{x+1}} \rightarrow \frac{x-1}{x+1} > 0 \rightarrow \frac{-1}{+8-1} + (-\infty, -1), (1, +\infty) \quad (I)$ $D_f = (-\infty, -1)$

$\log \frac{x-1}{x+1} > 0 \Rightarrow \frac{x-1}{x+1} > 1 \Rightarrow \frac{x-1}{x+1} - 1 > 0 \Rightarrow \frac{-2}{x+1} > 0 \Rightarrow \frac{-1}{x+1} < 0 \Rightarrow x < -1 \quad (II)$

$f(x) = \sqrt{(a+2)x^2 + ax + b}$ ضریب x^2 باید به باشد زیرا دامنه متعلق به تابع خطی است:

$a+2=0 \Rightarrow a=-2 \Rightarrow f(x) = \sqrt{-2x+b}$

$-2x+b \geq 0 \Rightarrow x \leq \frac{b}{2}$
 $D_f = (-\infty, \frac{b}{2}] \Rightarrow \frac{b}{2} = 3 \Rightarrow b = 6$

$f(x) = \sqrt{x^2 + 2x + 2 - m^2}$ دامنه تابع برابر اعداد حقیقی می باشد در شیب عبارت زیر را در یکال محصوره نامی است.

$x^2 + 2x + 2 - m^2 \geq 0$

شرط نامی: $a > 0 \rightarrow 1 > 0 \checkmark$

$\Delta = 4 - 4(2 - m^2) \leq 0 \Rightarrow 4m^2 - 4 \leq 0 \Rightarrow m^2 - 1 \leq 0 \Rightarrow (m-1)(m+1) \leq 0$

$\rightarrow \frac{-1}{+4} \leq m \leq \frac{1}{+4}$ بیشترین $-1 \leq m \leq 1$ کمترین $1 - (-1) = 2$

$f(x) = \frac{\sqrt{4-2x}}{[x] + [-x] + 1} \rightarrow 4-2x \geq 0 \Rightarrow (2-x)(2+x) \geq 0 \Rightarrow \frac{-2}{-4} \leq x \leq \frac{2}{+4} \Rightarrow -1 \leq x \leq 2 \quad (I)$
 $[x] + [-x] + 1 \rightarrow x \in \mathbb{Z} \quad (II)$

$y = [x] + [-x] \rightarrow y = [x] + [-x] + 1$

$\Rightarrow D_f = \{-2, -1, 0, 1, 2\}$

