

الف) $y = \frac{x+3}{2x^3+3x^2-11x+3} = \frac{(x+3)}{(x-1)(2x^2+5x-3)} = \frac{(x+3)}{(x-1)(2x-1)(x+3)}$

۲

$D_y = IR - \left\{1, \frac{1}{2}, -3\right\}$

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

الف) $y = \frac{x+3}{x^3-5x^2+2x-1} = \frac{x+3}{(x-1)(x^2-x+1)} \Rightarrow D_y = IR - \{1\}$

۳

ب) $y = \sqrt{\frac{x+3}{x^3-2x^2+2x-1}} = \sqrt{\frac{x+3}{(x-1)(x^2-x+1)}} \Rightarrow \frac{-3}{x-1} + \frac{1}{x^2-x+1} \Rightarrow D_y = (-\infty, 1) \cup (1, +\infty)$

$y = \frac{2}{x^2-5|x-1|-2x+5} \rightarrow \frac{2}{x^2+2x} = \frac{2}{x(x+2)} \quad \frac{2}{x^2-5x+10} = \frac{2}{(x-2)(x-5)}$

$\Rightarrow \begin{cases} x \neq 0 \\ x \neq -2 \\ x < 1 \end{cases} \quad \frac{2}{x} = \frac{1}{x} \quad \Rightarrow \begin{cases} x \neq 2 \\ x \neq 5 \\ x > 1 \end{cases}$

$\Rightarrow x \neq \{0, -2\} \quad (I) \quad \Rightarrow x \neq \{2, 5\} \quad (II)$

$(I) \cup (II) \Rightarrow D_y = IR - \{0, -2, 2, 5\}$

۴

الف) $y = \frac{x+3}{|2x+1|-|x+3|}$

$\frac{-3}{-2x-1+x+3} = \frac{-3}{-x+2} \quad \frac{-1}{-2x-1-x-3} = \frac{-1}{-3x-4} \quad \frac{-1}{2x+1-x-3} = \frac{-1}{x-2}$

$\Rightarrow -x+2 \neq 0 \Rightarrow x \neq 2 \quad \Rightarrow -3x-4 \neq 0 \Rightarrow x \neq -\frac{4}{3} \quad \Rightarrow x-2 \neq 0 \Rightarrow x \neq 2$

$\Rightarrow x \neq 2 \quad \Rightarrow x \neq -\frac{4}{3} \quad \Rightarrow x \neq 2$

$(I) \cup (II) \cup (III) \Rightarrow D_y = IR - \left\{-\frac{4}{3}, 2\right\}$

۵

الف) $y = \log_r \left(\frac{1-\log_r x}{1-\log_r \frac{x}{r}} \right) \quad x > 0 \quad (I)$

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

$(I) \cap (II) \Rightarrow x \in (0, r) \Rightarrow D_y = (0, r)$

۶

ب) $y = \log_r \left(\frac{1-\log_r \frac{x}{r}}{1-\log_r \frac{x}{\frac{1}{r}}} \right) \quad x > 0 \quad (I)$

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

$(I) \cap (II) \Rightarrow x > \frac{1}{r} \Rightarrow D_y = \left(\frac{1}{r}, +\infty\right)$

۷

$$f(x) = \sqrt{\log_{\frac{1}{2}} \log_{\frac{1}{2}} (2x-1)} \rightarrow 2x-1 > 0 \Rightarrow x > \frac{1}{2} \quad (I)$$

$$\log_{\frac{1}{2}} \log_{\frac{1}{2}} (2x-1) \geq 0 \Rightarrow \log_{\frac{1}{2}} (2x-1) \leq 1 \Rightarrow 2x-1 \leq 2 \Rightarrow x \leq \frac{3}{2} \quad (II)$$

$$(I) \cap (II) \Rightarrow x \in \left(\frac{1}{2}, \frac{3}{2}\right]$$

$$\Rightarrow D_f = \left(\frac{1}{2}, \frac{3}{2}\right]$$

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



$$D_y = \left(2k\pi - \frac{\pi}{3}, 2k\pi + \frac{5\pi}{3}\right)$$

$$y = \sqrt{\log \frac{x-1}{x+1}} \rightarrow \frac{x-1}{x+1} > 0 \Rightarrow x < -1 \text{ or } x > 1 \quad (I)$$

$$\log \frac{x-1}{x+1} \geq 0 \Rightarrow \frac{x-1}{x+1} \geq 1 \Rightarrow x-1 \geq x+1 \Rightarrow -2 \geq 2 \Rightarrow \text{No solution}$$

$$D_y = (-\infty, -1)$$

باتوجه به دامنه تابع که متعلق به یک تابع خطی می باشد پس ضریب x^2 باید برابر با ۰ شود:

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

$$\rightarrow -2x + b \geq 0 \Rightarrow x \leq \frac{b}{2} \Rightarrow \frac{b}{2} = 3 \Rightarrow b = 6$$

$$D_f = (-\infty, 3]$$

باتوجه به دامنه تابع، برای هر مقدار حقیقی x ، تابع تعریف می شود پس عبارت زیر را بسازیم تا دامنه باشد:

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

$$m^2 - 2m - 2 \leq 0 \Rightarrow m \in [1 - \sqrt{3}, 1 + \sqrt{3}]$$

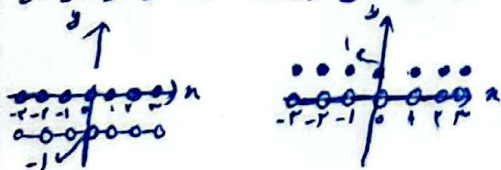
$$\rightarrow \frac{-1 \pm \sqrt{1+4}}{2} = \frac{-1 \pm \sqrt{5}}{2}$$

$$D_f = \left[\frac{-1 - \sqrt{5}}{2}, \frac{-1 + \sqrt{5}}{2}\right]$$

$$f(x) = \sqrt{4 - x^2} \rightarrow 4 - x^2 \geq 0 \Rightarrow x \in [-2, 2] \quad (I)$$

$$[x] + [-x] + 1 \rightarrow x \in \mathbb{Z} \quad (II)$$

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



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

دامنه تابع شامل اعداد صحیح می باشد