

$$x^3 + 3x^2 - 8x + 3 \neq 0 \rightarrow x^3 + 3x^2 - 8x + 3 + (x-1) = x^3 + 3x^2 - 7x + 4 = (x-1)(x^2 + 4x - 3)$$

$$\Delta = 49, x = \frac{1}{2}, -3, 1 \Rightarrow D_f = \mathbb{R} - \{1, -3, \frac{1}{2}\}$$

ب) $x^3 + 9x^2 + 14x + 3 \neq 0 \rightarrow x^3 + 9x^2 + 14x + 3 + (x+1) = x^3 + 9x^2 + 15x + 4 = (x+1)(x^2 + 8x + 4)$

$$\Delta = 48, x = \frac{-7 \pm \sqrt{49}}{4} = -\frac{1}{4}, -3 \Rightarrow D_f = \mathbb{R} - \{-\frac{1}{4}, -1, -3\}$$

الف) $x^3 - 2x^2 + 2x - 1 \neq 0 \rightarrow x^3 - 2x^2 + 2x - 1 + (x-1) = x^3 - 2x^2 + 3x - 2 = (x-1)(x^2 - x + 2)$

$\Delta < 0$ ریشه ندارد و همیشه مثبت است

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

ب) $\frac{x+3}{x^3 - 2x^2 + 2x - 1} \geq 0 \Rightarrow x = -3, 1$

$\frac{x}{+} \frac{-3}{+} \frac{1}{-} \frac{1}{+}$ $D_f = (-\infty, -3] \cup (1, +\infty)$

$x^2 - \omega|x-1| - 2x + \omega \neq 0 \rightarrow \omega|x-1| = -x^2 + 2x - \omega, |x-1| = \frac{x^2 - 2x + \omega}{\omega} \rightarrow x-1 = \pm \frac{x^2 - 2x + \omega}{\omega}$

$x = \frac{x^2 - 2x + \omega}{\omega} + 1 = \frac{x^2 - 2x + \omega + \omega}{\omega}, x^2 - 2x + \omega = \omega x, x^2 - 2x + \omega = 0, \Delta = 4, x = \omega, 2$

$x = \frac{-x^2 + 2x - \omega}{\omega} + 1 = \frac{-x^2 + 2x - \omega + \omega}{\omega}, -x^2 + 2x = \omega x, -x^2 - 3x = 0, x = 0, -3$

$$D_f = \mathbb{R} - \{-3, 0, 2, \omega\}$$

الف) $|2x+1| - |x+3| \neq 0, |2x+1| \neq |x+3| \rightarrow (2x+1)^2 \neq (x+3)^2 \rightarrow 4x^2 + 4x + 1 \neq x^2 + 6x + 9$

$3x^2 - 2x - 8 \neq 0, \Delta = 100, x = \frac{1 \pm 10}{6} \rightarrow x = 2, -\frac{4}{3} \Rightarrow D_f = \mathbb{R} - \{-\frac{4}{3}, 2\}$

ب) $|2x+1| - |x+3| \geq 0, |2x+1| \geq |x+3| \rightarrow (2x+1)^2 \geq (x+3)^2 \rightarrow 4x^2 + 4x + 1 \geq x^2 + 6x + 9$

$3x^2 - 2x - 8 \geq 0, x = 2, -\frac{4}{3} \Rightarrow D_f = (-\infty, -\frac{4}{3}] \cup [2, +\infty)$

الف) $\log_x x \rightarrow x > 0 \textcircled{1}, \log_x^{(1-\log_x^2)} \rightarrow 1 - \log_x^2 > 0, \log_x^2 < 1, x < 10 \textcircled{2}$

$\textcircled{1} \cap \textcircled{2} \rightarrow D_f = (0, 10)$

ب) $\log_{\frac{1}{x}} x \rightarrow x > 0 \textcircled{1}, \log_{\frac{1}{x}}^{(1-\log_{\frac{1}{x}}^2)} \rightarrow 1 - \log_{\frac{1}{x}}^2 > 0, \log_{\frac{1}{x}}^2 < 1, x > \frac{1}{10} \textcircled{2}$

$\textcircled{1} \cap \textcircled{2} \rightarrow D_f = (\frac{1}{10}, +\infty)$

$\log_{\omega}^{(\nu x-1)} \rightarrow \nu x-1 > 0, \nu x > 1, x > \frac{1}{\nu} \quad (1)$ $\log_{\omega}^{(\log_{\omega}^{(\nu x-1)})} \rightarrow \log_{\omega}^{(\nu x-1)} > 0, \nu x-1 > 1, \nu x > 2, x > 1 \quad (2) \quad D_f = (1) \cap (2) \cap (3) = [3, +\infty)$ $\log_{\omega}^{(\log_{\omega}^{(\nu x-1)})} \geq 0 \rightarrow \log_{\omega}^{(\nu x-1)} \geq 1, \nu x-1 \geq \omega, \nu x \geq 4, x \geq \frac{4}{\nu} \quad (3)$	6
الف) $\nu(\cos x + 1) > 0$ و $\nu \cos x > -1$ و $\cos x > -\frac{1}{\nu} \rightarrow D_f = (\nu x - \frac{\nu x}{\nu}, \nu x + \frac{\nu x}{\nu})$ ب) $\log_{\frac{x-1}{x+1}} > 0$ و $\frac{x-1}{x+1} > 1$ و $x-1 > x+1 \times (1)$ هیچ مقدار جواب نمی دهد $(1) \cup (2) = (-\infty, -1) \cup (1, +\infty)$ $\frac{x-1}{x+1} > 0 \rightarrow x = 1, -1 \rightarrow \frac{x-1}{x+1} > 1 \rightarrow (-\infty, -1) \cup (1, +\infty) \quad (2)$	7
همان تعیین علامت ریشه ها در سمت چپ ریشه علامت، مخالف علامت ضرب و در سمت راست ریشه علامت مطابق علامت ضرب است. در این عبارت به علت همواره مثبت بودن زیر رادیکال و تقریباً دایره در $[-3, +\infty)$ ضرب ν با ν منفی شود $\nu < -2$ و $a < -2$ $x=3 \rightarrow 9a+11+3a+b=0, 12a+11+b=0 \rightarrow a = \frac{-b-11}{12}$ $a < -2, \frac{-b-11}{12} < -2 \rightarrow -b-11 < -24, -b < -13, b > 13$	8
$x^2 + \nu x + \frac{\nu-m^2}{c} > 0 \rightarrow \Delta \leq 0$ و $a > 0 \rightarrow \Delta = 4 - 4(\nu - m^2) = 4 - 4\nu + 4m^2 \leq 0$ $-4 + 4m^2 \leq 0$ و $4m^2 \leq 4$ و $m^2 \leq 1 \rightarrow -1 \leq m \leq 1$ اختلاف = 2 $\Rightarrow$ بیشترین = 1 و کمترین = -1	9
$x^2 \geq 0$ و $x^2 < 4 \rightarrow -2 < x < 2 \quad (1)$ $[x] + [-x] + 1 \neq 0 \rightarrow [x] + [-x] \neq -1 \rightarrow x \in \mathbb{Z} \quad (2)$ $(1) \cap (2) \rightarrow D_f = \{-2, -1, 0, 1, 2\}$ دارای 5 عدد صحیح است	10