

الف) $(n-1)(n^2+5n-3) = R - \{1, -\frac{1}{2}, \frac{1}{3}\}$

$n^2+5n-3 = 0$

$(n+3)(n-1) = 0$

$R - \{1, -\frac{1}{2}, \frac{1}{3}\} = -3$

ب) $(n+1)(n^2+7n+3) = R - \{1, -\frac{1}{2}, \frac{1}{3}\}$

$n^2+7n+3 = 0$

$(n+1)(n+4) = 0$

$(-\frac{1}{2})(-\frac{3}{2}) = -\frac{3}{4}$

$\frac{n^2+5n-3}{n^2+5n-3} = \frac{n^2+5n-3}{n^2+5n-3}$

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الف) $n^3 - n^2 + n - 1 = (n-1)(n^2 - n + 1) = R - \{1\}$

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ب) $\frac{-3}{+0-1} + (1, 0) \cup (-\infty, 3]$

$n^2 - 5n - 11 - 2n + 5 \neq 0 \rightarrow n > 1 \rightarrow n^2 - 5n + 5 - 2n + 5 = n^2 - 7n + 10$

$n^2 + 5n - 5 - 2n + 5 = n^2 + 3n = n(n+3) \neq 0$

$n^2 - 2n + 5 = 0 \rightarrow \Delta < 0 \rightarrow \text{no real roots}$

$D_f = R - \{-3, 0, 2, 5\}$

الف) $[-n] - 2 \geq 0 \rightarrow [-n] \geq 2 \rightarrow n \leq -2$

ب) $[n]^2 - 2[n] - 3$

$t^2 - 2t - 3 = (t-3)(t+1)$

$3 \leq n < 4 \rightarrow [n] = 3$

$-1 \leq n < 0 \rightarrow [n] = -1$

الف) $[n - \frac{1}{p}] + [n + \frac{p}{p}] \geq 0$

$[n + \frac{p}{p} - 1] + [n + \frac{p}{p}] \geq 0$

$[n + \frac{p}{p}] + [n + \frac{p}{p}] \geq 1$

$2[n + \frac{p}{p}] \geq 1 \rightarrow [n + \frac{p}{p}] \geq \frac{1}{2} \rightarrow [n + \frac{p}{p}] \geq 1 \rightarrow n + \frac{p}{p} \geq 1 \rightarrow n \geq \frac{1}{p}$

ب) $[n - \frac{1}{p}] + [\frac{1}{p} - n] \geq 0$

$[n] + [-n] \geq 0 \rightarrow n \in \mathbb{Z}$

$D_f = \{n \mid n = k + \frac{1}{p}, k \in \mathbb{Z}\}$

الف) $y = \frac{\cos x}{\sin x} + 1$ $\frac{\sin x}{\cos x} + 1 \neq 0$ $\frac{\sin x}{\cos x} \neq -1$ $R = \left\{ \frac{k\pi}{\pi}, k\pi - \frac{\pi}{2}, k\pi + \frac{\pi}{2} \right\}$

$\frac{\sin x}{\cos x} + 1$ $\sin x \neq 0$ $\cos x \neq 0$

ب) $1 - \sin^2 x > 0$

$\sin^2 x < 1 \rightarrow \sin x \in \left(-\frac{1}{\sqrt{2}}, \frac{1}{\sqrt{2}} \right) \cup \left(\frac{1}{\sqrt{2}}, 1 \right) \cup \left(-1, -\frac{1}{\sqrt{2}} \right) \cup \left(-\frac{1}{\sqrt{2}}, -1 \right)$

$\{ [k\pi - \frac{\pi}{4}, k\pi + \frac{\pi}{4}] \}$

الف) $\sqrt{2} \sin x - 1 > 0 \rightarrow \sqrt{2} \sin x > 1 \rightarrow \sin x > \frac{1}{\sqrt{2}}$

$\{ [k\pi + \frac{\pi}{4}, k\pi + \frac{3\pi}{4}] \}$

ب) $1 - \sqrt{2} \cos x > 0 \rightarrow \sqrt{2} \cos x < 1 \rightarrow \cos x < \frac{1}{\sqrt{2}}$

$P_f = [k\pi + \frac{\pi}{4}, k\pi + \frac{3\pi}{4}]$

الف) $-1 < x^2 + y^2 + 1 < 1 \rightarrow x^2 + y^2 + 1 < 1 \rightarrow x^2 + y^2 < 0 \rightarrow x = 0, y = 0$

$x^2 + y^2 + 1 > -1 \rightarrow x^2 + y^2 > -2 \rightarrow x^2 + y^2 > 0 \rightarrow x \neq 0, y \neq 0$

$I \cap I = [-\sqrt{2}, \sqrt{2}] \cup [-1, 0]$

$[-\sqrt{2}, \sqrt{2}] \cup [-1, 0]$

ب) $\sqrt{2} - y^2 < 1$

$\sqrt{2} - y^2 < 1 \rightarrow -1 < \sqrt{2} - y^2 < 1 \rightarrow -\sqrt{2} < -y^2 < 1 - \sqrt{2} \rightarrow y^2 < \sqrt{2} - 1$

$P_f = [1, \sqrt{2}]$

الف) $1 - \log_{\frac{1}{2}} x > 0$ $\log_{\frac{1}{2}} x < 1 \rightarrow x < \frac{1}{2}, x > 0 \rightarrow (0, \frac{1}{2})$

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

الف) $\sqrt{2} \sin x - 1 > 0$ $\sqrt{2} \sin x > 1$ $\sin x > \frac{1}{\sqrt{2}}$

$\{ [k\pi + \frac{\pi}{4}, k\pi + \frac{3\pi}{4}] \}$

ب) $\frac{x^2 + 1}{x^2 + 2} \in W \xrightarrow{du} u = \frac{x^2 + 1}{x^2 + 2}$ $P_f = \{ u \mid u = \frac{x^2 + 1}{x^2 + 2}, x \in W \}$