

الف) $y-1 = n^3 - 3n^2 + 3n - 1 = (n-1)^3 \quad \sqrt[3]{y-1} = n-1 \quad R_f = \mathbb{R}$

ب) $yn^2 - 2yn - 1 = 0 \quad n = \frac{2y \pm \sqrt{4y^2 + 4y}}{2y} \quad \Delta \geq 0 \quad 4y^2 + 4y \geq 0$

$4y(y+1) \geq 0 \quad R_f = (-\infty, -1] \cup [0, +\infty)$
 $y \neq 0$

الف) $\frac{4x^2 - 14}{4} = 4 \quad R = [4, +\infty) \quad \frac{-D}{4a} = \text{Max or min}$

ب) $+\frac{14 + 34}{+4} = 14 \quad R = (-\infty, 14]$

ج) $-\frac{14 - 14}{-4} = -4 \quad \sqrt{[-4, +\infty)} \Rightarrow R = [0, +\infty)$

د) $-\frac{34}{-4} = 9 \quad \sqrt{[-9, 9]} \Rightarrow R = [0, 9]$

الف) $\sqrt[n]{n} \Rightarrow R_f = \mathbb{R}$

ب) $\sqrt[n]{n} \Rightarrow R_f = \mathbb{R}$

ج) $\sqrt[n]{n} \Rightarrow \sqrt{12} \Rightarrow R_f = [0, +\infty)$

د) $n^{\omega} - 3n^2 + 3n + 1 \Rightarrow \mathbb{R} \quad y = (12)^2 \Rightarrow R_f = [0, +\infty)$

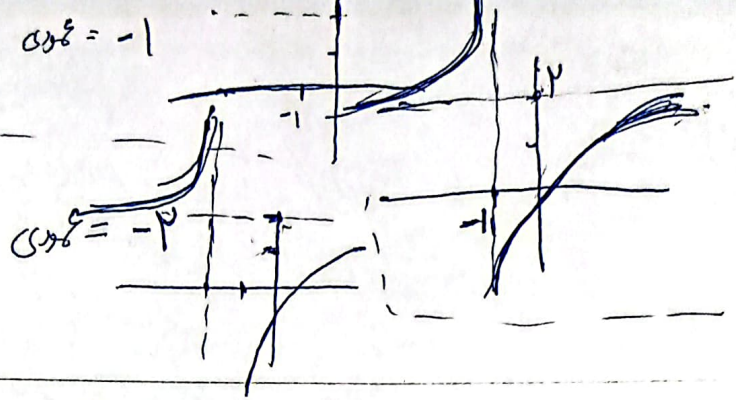
الف) $\frac{3n+1}{n-2} \quad \text{افق} = \frac{3}{1} \Rightarrow R_f = \mathbb{R} - \{3\}$

ب) $\frac{2n+1}{n+1} \quad \text{افق} = \frac{2}{1} \Rightarrow R_f = \mathbb{R} - \{2\}$

الف) $\sqrt{\frac{3n+4}{n+1}} \Rightarrow \sqrt{\mathbb{R} - \{3\}} \Rightarrow R_f = [0, +\infty) - \{\sqrt{3}\}$

ب) $\sqrt{\frac{2n+1}{2-n}} \Rightarrow \sqrt{\mathbb{R} - \{2\}} \Rightarrow R_f = [0, +\infty)$

الف) $\frac{m-1}{n+1}$ افقي = 1 مائل = -1



ب) $\frac{m-1}{n+1}$ افقي = 1 مائل = -1

الف) $\sin n \Rightarrow 1, -1 \Rightarrow \sin n + \frac{1}{\sin n} \Rightarrow R_f = (-\infty, -1] \cup [1, +\infty)$

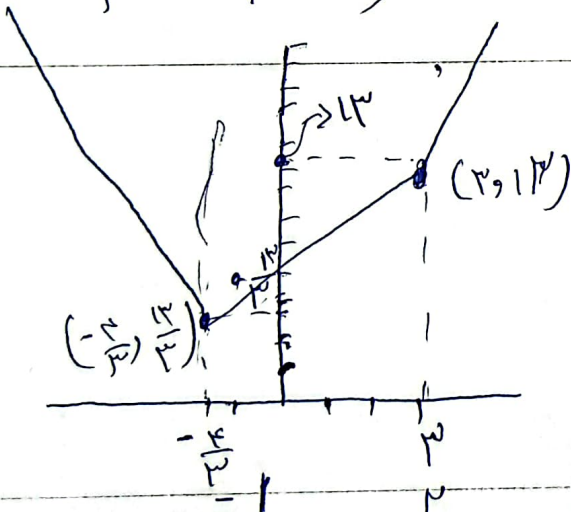
ب) $n^p + \frac{1}{n^p} \Rightarrow n^p = 1, -1 \Rightarrow R_f = (-\infty, -1] \cup [1, +\infty)$

ج) $\sqrt[n]{n} + \frac{1}{\sqrt[n]{n}} \Rightarrow \sqrt[n]{n} = 1, -1 \Rightarrow R_f = (-\infty, -1] \cup [1, +\infty)$

د) $\sqrt{n} + \frac{1}{\sqrt{n}} \Rightarrow \sqrt{n} \geq 0 \Rightarrow R_f = [1, +\infty)$

الف) $y + \frac{1}{y} = n^2 + \frac{1}{n^2} + \frac{1}{n^2 + \frac{1}{n^2}}$ $n^2 + \frac{1}{n^2} > 0$ $\omega_{\frac{1}{y}} = \frac{1}{y} = \frac{1}{n^2 + \frac{1}{n^2}}$ $R_f = [\frac{1}{y}, +\infty)$
 $y + \frac{1}{y} \geq \frac{1}{y} \Rightarrow y \geq \frac{1}{y}$

ب) $y = \sqrt{n^2 + \frac{1}{n^2}} + \frac{1}{\sqrt{n^2 + \frac{1}{n^2}}} \Rightarrow \sqrt{n^2 + \frac{1}{n^2}} > 0$ $\omega_{\frac{1}{y}} = \sqrt{y} = y$ $y + \frac{1}{y} = \frac{\omega}{y}$
 $R_f = [\frac{\omega}{y}, +\infty)$



$f(n) = \begin{cases} -n-1 & n \leq -\frac{1}{p} \\ n+1 & -\frac{1}{p} \leq n \leq \frac{1}{p} \\ n+1 & n \geq \frac{1}{p} \end{cases}$

$R_f = [\frac{1}{p}, +\infty)$

الف) $-n-1 \mid n+1 \mid n$

$R_f = [1, +\infty)$

ب) $-n+1 \mid -n+1 \mid n-1$

$R_f = [1, +\infty)$

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