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$$\rightarrow \log y = \sin n, e \rightarrow y = 1. \quad \begin{matrix} \sin n = 1 \rightarrow y = 10^5 \\ \sin n = -1 \rightarrow y = 10^{-5} \end{matrix}$$

$$R_f = \{10^5, 10^{-5}\}$$

$$\text{الف} \quad \sqrt{n+1/n} + 1 \rightarrow n \rightarrow (\sqrt{n}+1)^2 = n+1 \rightarrow R_f = [1+\sqrt{2}, +\infty)$$

$$\rightarrow f = -\sin n + 2\sin n + 2 \rightarrow \begin{matrix} \sin n = 1 \rightarrow f \\ \sin n = -1 \rightarrow -1 \\ -\frac{b}{a} = 1 \end{matrix} \rightarrow R_f = \{0, 4\}$$

$$x = -1/c, n+1. \rightarrow R_f = \{1, 1/c, -1\}$$

$$\begin{matrix} (1, \frac{1}{c}) & (1, \frac{1}{c}) & (1, \frac{1}{c}) \\ (2, \frac{1}{c}) & (2, \frac{1}{c}) & (2, \frac{1}{c}) \\ (3, \frac{1}{c}) & (4, \frac{1}{c}) & (4, \frac{1}{c}) \end{matrix} \rightarrow R_f = \{\frac{1}{c}, \frac{2}{c}, \dots, \frac{19}{c}\}$$

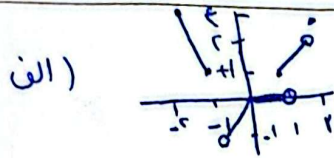
$$f(x) = \sqrt{ax^2+bx+c} \rightarrow y \rightarrow a=0, b+c=0 \rightarrow c=-b$$

$$f(3) = 1 \rightarrow 3b - 3b = 1 \rightarrow b = 1, c = -1$$

$$\rightarrow g(n) = \sqrt{n^2+1} \rightarrow R_{fg} = [1, +\infty)$$

$$y = |x-2| - |x-1| \quad \sim x \rightarrow -1 \rightarrow y = -1/2 x$$

$k = -1/2$



ب) $\begin{cases} x_1: x-2 \\ x_2: -x-1 \end{cases}$

$$\frac{(\sqrt{x}-3)(\sqrt{x}-1)}{(\sqrt{x}-1)^2} = \frac{\sqrt{x}-3}{\sqrt{x}-1} \quad x \rightarrow \min \quad R_f = [3, +\infty)$$