

١) $x - y[\frac{x}{y}] = y(\frac{x}{y}) - y[\frac{x}{y}] = y(\frac{x}{y} - [\frac{x}{y}]) \Rightarrow [0, y)$ ①

$R = [0, y)$ کدام دارد

٢) $\log y = \frac{\sin x + F}{[y, \infty)} \Rightarrow y = [1.3, 1.5] \Rightarrow R = [1.3, 1.5]$

~~٣) $R = [0, 1)$~~ ②

$\frac{x^2 - F}{x^2 - 1} = y \Rightarrow x^2 = \frac{y^2 - F}{y^2 - 1} \Rightarrow \frac{y^2 - F}{y^2 - 1} \geq 0$ $\frac{+}{-} \frac{+}{-}$ $R = (-\infty, \frac{F}{2}] \cup (1, +\infty)$

$[0, \frac{F}{2}] \cup (1, +\infty)$ اعمال، اعمال
 $[a, b] \cup (c, +\infty) \Rightarrow a + b + c = \frac{a+b+c}{y}$

٤) $\sqrt{x + \frac{1}{x}} = \square$

$\sqrt{x + \frac{1}{x}} \in [\sqrt{2}, +\infty)$

$\sqrt{x + \frac{1}{x}} = \sqrt{2} \Rightarrow f(x) = 2 + 2\sqrt{2}$ ③
 $\sqrt{x + \frac{1}{x}} = \infty \Rightarrow f(x) = \infty$
 $\sqrt{x + \frac{1}{x}} = -1 \rightarrow \text{جواب ندارد}$
 $\Rightarrow R = [2 + 2\sqrt{2}, +\infty)$

ب) $(2 - \sin x)(1 + \sin x) = -\sin^2 x + 2\sin x + 2$ $\sin x = \square$
 $\Rightarrow -1 \leq \sin x \leq 1$ $\sin x = -1 \Rightarrow y = 0$
 $\sin x = 1 \Rightarrow y = 2$ $\sin x = \frac{b}{a} = 1 \Rightarrow y = 2$
 $\Rightarrow R = [0, 2]$

$$D = \{1, 2, 3, \dots, 9\}$$

$$x=1 \Rightarrow f(1) = \frac{19}{1}$$

$$x=2 \Rightarrow f(2) = \frac{18}{2}$$

برای هر x از D یک عدد $f(x)$ داریم

$$x=9 \Rightarrow f(9) = \frac{11}{9}$$

$$\Rightarrow R = \left\{ \frac{19}{1}, \dots, \frac{18}{9}, \frac{11}{9} \right\}$$

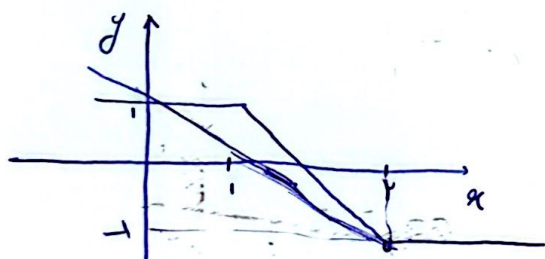
$$\frac{19}{1} + \frac{18}{2} + \dots + \frac{11}{9} = 9 \left(\frac{19}{1} + \frac{18}{2} + \dots + \frac{11}{9} \right) = 9 \left(\frac{19}{1} + \frac{18}{2} + \dots + \frac{11}{9} \right)$$

تابع f نسبت به x نزاد است $\Rightarrow \alpha=0$

$$bx+c \geq 0 \Rightarrow x \geq -\frac{c}{b} \Rightarrow -\frac{c}{b} = 2 \Rightarrow 2b = -c \Rightarrow b=1, c=-2$$

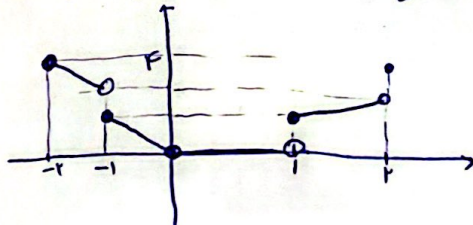
$$f(3)=1 \Rightarrow 3b+c=1$$

$$g(x) = \sqrt{x^2+4} \Rightarrow \min_{x \in \mathbb{R}} g(x) = 2 \Rightarrow R = [2, +\infty)$$



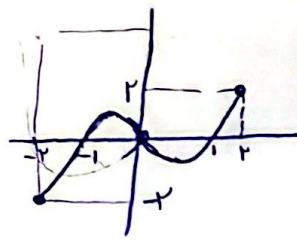
$$y=kx \quad (2, -1) \Rightarrow -1 = 2k \Rightarrow k = -\frac{1}{2}$$

$$\begin{aligned} x=2 \Rightarrow y=2x & \quad 0 \leq x < 1 \Rightarrow y=0 \\ 1 \leq x < 2 \Rightarrow y=x & \quad -1 \leq x < 0 \Rightarrow y=-x \end{aligned}$$



$$R = [0, 4] - \{2\}$$

$$\rightarrow \begin{array}{c|c} -x^2-x & x^2-x \end{array}$$



$$R = [-1, 1]$$

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$$y = \frac{y^2 + y}{x^2 + x} = \frac{y(y+1)}{x(x+1)} = \frac{y}{x} \quad \text{①}$$

$x^2 + x \neq 0 \rightarrow \begin{cases} x \neq -1 \\ x \neq 0 \end{cases}$

$$\Rightarrow y \neq -1, y \neq 0$$

$$R_f = R - \underbrace{[-1, 0]}_{\hookrightarrow a+b = -1}$$

②

$$y = \frac{x - 1\sqrt{x} + 1}{x - 1\sqrt{x+1}} = \frac{(\sqrt{x}-1)(\sqrt{x}+1)}{(\sqrt{x}-1)^2} = \frac{\sqrt{x}-1}{\sqrt{x}-1}$$

$$\Rightarrow \sqrt{x} = \frac{y-1}{y-1} \Rightarrow \frac{y-1}{y-1} \geq 0 \Rightarrow \frac{+}{-} \frac{1}{0} \frac{+}{+}$$

باید
مخرج

$$\frac{y-1}{y-1} \neq 1 \Rightarrow \text{همواره برابر}$$

$$\hookrightarrow R = (-\infty, 1) \cup [1, +\infty)$$

$$\frac{x^2 + yx^2 - x - 1}{x^2 - 1} = \frac{(x+1)(x+1)}{(x-1)(x+1)} = x+1$$

$$\hookrightarrow \left. \begin{matrix} x \neq 1 \\ x \neq -1 \end{matrix} \right\} \begin{matrix} y = x+1 \\ \Rightarrow y \neq \underline{1}, 1 \end{matrix} \quad x+1 = \underline{1}$$