

الف) $y = \sin x + t \Rightarrow y = 1. \sin x + t$
 $-1 \leq \sin x \leq 1 \Rightarrow -1 \leq \sin x + t \leq 1$
 $y = 1. \sin x + t \Rightarrow 1. \sin x + t \leq 1 \Rightarrow 1. \sin x \leq 1 - t \Rightarrow 1. \sin x \leq 1 - t$
 $R_f = [1-t, 1]$

الف) $f\left(\frac{x}{t} - \left[\frac{x}{t}\right]\right) \rightarrow t - [t] \in [0, 1]$
 $\Rightarrow f(x) \in [0, 1]$
 $\Rightarrow R_f = [0, 1]$

$x^2 \rightarrow 0 \Rightarrow \frac{x^2 - t}{x^2 - 9} = \frac{t}{9}$
 $x^2 \rightarrow +\infty \Rightarrow \frac{x^2 - t}{x^2 - 9} = 1$
 $\Rightarrow \frac{x^2 - t}{x^2 - 9} \in (-\infty, \frac{t}{9}] \cup (1, +\infty)$

$\sqrt{\frac{x^2 - t}{x^2 - 9}} \in [0, \frac{t}{9}] \cup (1, +\infty)$
 $\Rightarrow R_f = [0, \frac{t}{9}] \cup (1, +\infty)$
 $\Rightarrow a + b + c = 0 + \frac{t}{9} + 1 = \frac{t}{9} + 1$

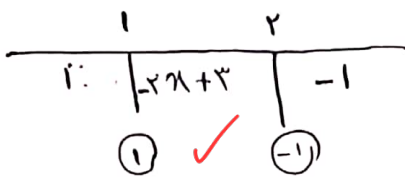
$y = 3 \sin x - \sin x - \sin^2 x + 3$
 $y = -\sin^2 x + 2 \sin x + 3$
 $\sin x \rightarrow \min = -1 \rightarrow 0$
 $\sin x \rightarrow \max = 1 \rightarrow 4$
 $-\frac{b}{2a} = 1 \rightarrow 1$
 $R_f = [0, 4]$

الف) $\sqrt{x + \frac{1}{x}} \geq 2 \Rightarrow t + \frac{1}{t} \geq 2$
 $\sqrt{x + \frac{1}{x}} \xrightarrow{\min} \sqrt{2}$
 $t = 2 \rightarrow \min = 2 + \frac{1}{2} = \frac{5}{2}$
 $t = +\infty \rightarrow \max = +\infty$
 $R_f = [\frac{5}{2}, +\infty)$
 $-\frac{b}{2a} = -\frac{1}{2} = -1 \rightarrow x$

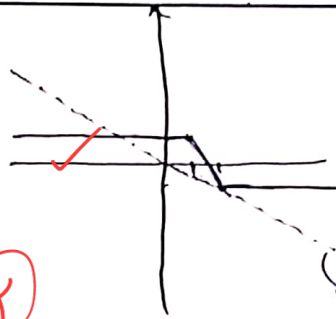
$D_f = \{1, 2, 3, 4, 5, 6, 7, 8, 9\}$
 $f \rightarrow$ دنباله حسابی
 $f(1) = \frac{29}{3}$
 $f(9) = \frac{21}{3}$
 $\Rightarrow S_{1,9} = (\frac{29}{3} + \frac{21}{3}) \times \frac{9}{2} = 108$

$0 \leq a x^2 + b x + c \rightarrow$ خطی است $\rightarrow a = 0$
 $y = \sqrt{bx + c} \quad b > 0 \quad \frac{2bx + c}{\sqrt{bx + c}} = 0$
 $\Rightarrow b = 1 \Rightarrow c = -2$
 $g(x) = \sqrt{x^2 - 2} \Rightarrow R_g = [0, +\infty)$
 $g(x) = \sqrt{x^2 + 2} \Rightarrow R_g = [2, +\infty)$

$$|x-2| - |x-1| = Kx$$



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$$K = \text{سب} = \frac{\Delta y}{\Delta x} = \frac{-1}{1} = -1$$

$$\Rightarrow K = -\frac{1}{1}$$

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$$y = x[x]$$

$$-2 \leq x < -1 \rightarrow -2x$$

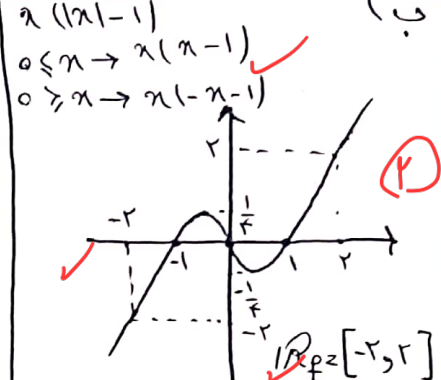
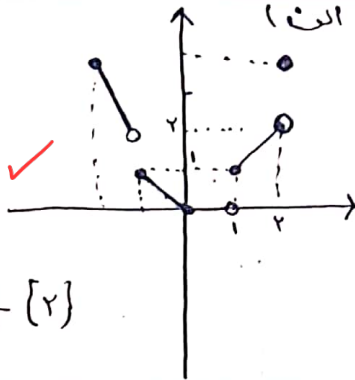
$$-1 \leq x < 0 \rightarrow -x$$

$$0 \leq x < 1 \rightarrow 0$$

$$1 \leq x < 2 \rightarrow x$$

$$x = 2 \rightarrow 2x$$

$$R = [0, 2] - \{1\}$$



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$$y = \frac{2(x+1)}{x(x+1)} = \frac{2}{x}, x \neq -1$$

$$\frac{2}{x} \in R - \{0\} \quad x \neq -1 \Rightarrow y = -2$$

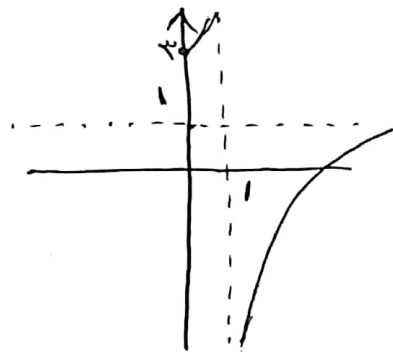
$$R_f = R - \{-2, 0\} \rightarrow a+b = -2$$

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$$\frac{(\sqrt{x}-3)(\sqrt{x}-1)}{(\sqrt{x}-1)(\sqrt{x}-1)} = \frac{\sqrt{x}-3}{\sqrt{x}-1} \quad \sqrt{x}=t \quad 0 \leq t \quad \frac{t-3}{t-1}$$

$$R = R - [1, 3]$$



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$$f(x) = \frac{(x^2-1)(x+2)}{x^2-1} = x+2, x \neq \pm 1$$

$$\left. \begin{array}{l} x=1 \rightarrow x+2=3 \\ x=-1 \rightarrow x+2=1 \end{array} \right\} \Rightarrow R_f = R - [1, 3]$$

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