

ب) $\log y = \sin x + 4 \rightarrow -1 \leq \sin x \leq 1 \quad 3 \leq \log y \leq 5$
 $10^3 \leq y \leq 10^5$

$$\sqrt{\frac{(x+2)(x-2)}{(x+3)(x-3)}}$$

-3	-2	-1	0	1	2	3
+	+	-	+	+	+	+
+	-	-	-	-	+	+
(+)	-	(+)	-	(+)	-	(+)

$$[0, \frac{2}{3}] \cup (9, +\infty)$$

$$a+b+c = \frac{29}{3}$$

الف) $(\sqrt{x + \frac{1}{x}} + 1)^2 \Rightarrow x + \frac{1}{x} \geq 2 \Rightarrow y \in ((\sqrt{2} + 1)^2, +\infty)$

ب) $-\sin^2 x + 2\sin x + 3 \Rightarrow \begin{cases} \sin x = 1 \Rightarrow 4 \\ \sin x = -1 \Rightarrow 0 \\ \sin x = -\frac{b}{a} \Rightarrow 2 \text{ غلط} \end{cases}$
 $y \in [0, 4]$

$$10 - \frac{1}{3} + 10 - \frac{2}{3} + 10 - 1 + \dots + 10 - 3 = 75$$

$$a = 0$$

تابع خط و صعودی

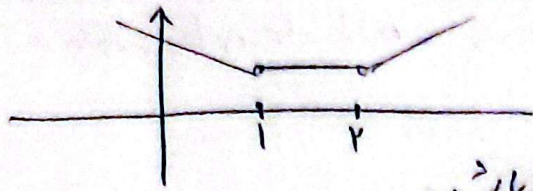
$$g(x) = \sqrt{x^2 + 4}$$

$$f(2) = 0 \Rightarrow 2b + c = 0$$

$$\Rightarrow g(x) \in [2, +\infty)$$

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

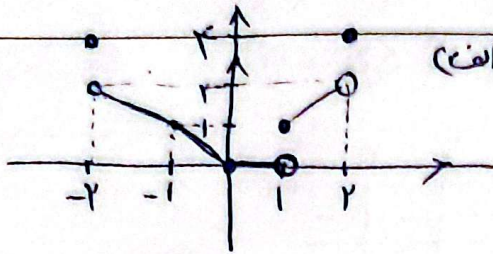
$$\underline{b = 1 \quad c = -2}$$



$$K > 2, K < -2$$

شیب خط حاصل ابتدا از شیب خط نزدیک باشد.

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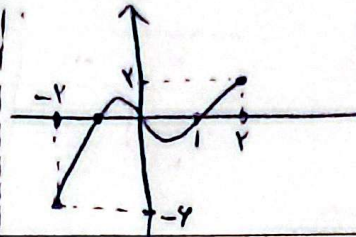
$$y \in [0, 2) \cup \{2\}$$

(الف)

$$x < 0 \rightarrow x^2 - 2$$

$$x \geq 0 \rightarrow x^2 - x$$

$$y \in [-1, 2]$$



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

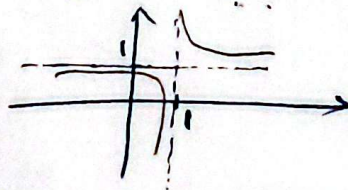
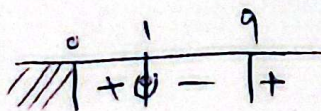
$$f(x) = \frac{2}{x} \quad f^{-1}(x) = \frac{2}{x} \quad D_{f^{-1}}(x) = \mathbb{R} \quad R_{f(x)} = \mathbb{R} - \{0\}$$

$$f(-1) = -2 \Rightarrow R_{f(x)} = \mathbb{R} - \{-2, 0\}$$

$$a+b = -2$$

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$$f(x) = \frac{(\sqrt{x} - 2)^2 - 1}{(\sqrt{x} - 1)^2} = \frac{(\sqrt{x} - 3)(\sqrt{x} - 1)}{(\sqrt{x} - 1)(\sqrt{x} - 1)} = \frac{\sqrt{x} - 3}{\sqrt{x} - 1}$$



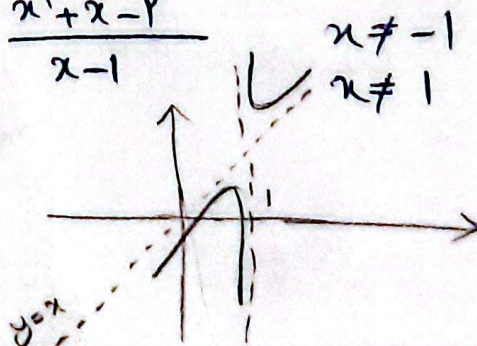
$$y \in \mathbb{R} - \{1\}$$

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

$$f(-1) = \frac{1-1-2}{-1} = 1$$

$$1+1=2$$



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