

الف $\Rightarrow +1 < [x] \leq +2$ به ازای هر عدد حقیقی $\Rightarrow \frac{x}{2} - 1 < [\frac{x}{2}] \leq \frac{x}{2} - 2 + 2 > -2 [\frac{x}{2}] > -2$ $\Rightarrow 0 \leq x - 2 [\frac{x}{2}] < 2$ به توان $\Rightarrow 0 \leq (x - 2 [\frac{x}{2}])^2 < 4$ $\Rightarrow [0, 4)$	ب $\log(y) = \sin(u) + 4$ $\min \log y = 3 \rightarrow y = 10^3$ $\rightarrow \log y = 4 \rightarrow y = 10^4$ $\max \log y = 5 \rightarrow y = 10^5$ $Rf = [10^3, 10^5]$
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1) $\frac{x^2-4}{x^2-9} \geq 0$ $\frac{-3}{+} \frac{-2}{-} \frac{+2}{+} \frac{+3}{+}$ $[0, \frac{2}{3}] \cup (1, +\infty)$ $a=0 \quad b=\frac{2}{3} \quad c=1$ $a+b+c = \frac{5}{3}$ $\min = 0 \rightarrow \frac{4}{9} \rightarrow \frac{2}{3}$ $\max = +\infty \rightarrow \text{در خارج} \Rightarrow \textcircled{1}$	2
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الف ① $x \neq 0$ ② $x + \frac{1}{x} > 0$ $\rightarrow D = [0, +\infty)$ ③ $\sqrt{x + \frac{1}{x}} = +$ $\rightarrow f(x) = + + 2 + \xrightarrow{\text{بررسی}} \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{-2 \pm \sqrt{4 - 4}}{2} = -1$ $\min + = \sqrt{2} \Rightarrow 2 + 2\sqrt{2}$ $\Rightarrow [2 + 2\sqrt{2}, +\infty)$	ب $y = (3 - \sin u)(1 + \sin u)$ $\min \sin u = -1 \rightarrow (4)(0) = 0$ $\sin u = 0 \rightarrow (3)(1) = 3$ $\max \sin u = 1 \rightarrow (2)(2) = 4$ $[0, 4]$
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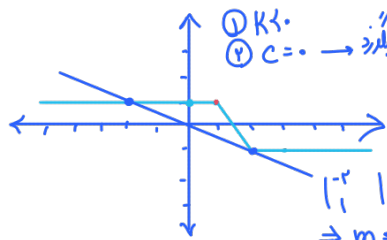
$f(x) = -\frac{1}{3}x + 10 \rightarrow D_f = \{1, 2, 3, 4, 5, 6, 7, 8, 9\}$ هر عضو در برد خود یک 10 دارد $9 \times 10 = 90$ هر عضو در برد خود یک 1 دارد $\Rightarrow -\frac{1+2+\dots+9}{3} \rightarrow \frac{(1+9) \times 9}{3} = -\frac{45}{3}$	4
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$ax^2 + bx + c \geq 0$ $\Rightarrow a > 0$ $\Rightarrow \Delta = 0$ $\Rightarrow (x-2)^2 \Rightarrow a(x-2)^2$ $\Rightarrow ax^2 - 4ax + 4a \Rightarrow b = -4a, c = 4a$	5
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$$y = |x-2| - |x-1| = \underline{kx}$$

$$\textcircled{2} \rightarrow \text{نقطه} \leftarrow \textcircled{1}$$

$$\begin{aligned} 2 &\rightarrow -1 \\ 1 &\rightarrow -1 \\ 1 &\rightarrow 1 \\ 0 &\rightarrow 1 \end{aligned}$$



$$\textcircled{1} K \neq 0 \rightarrow \text{خطی (نسبتاً) است} \Rightarrow K = -\frac{1}{2}$$

$$\Rightarrow m = \frac{-2}{-1} = -\frac{1}{2}$$

۶

$$\text{الف) } y = x[x]$$

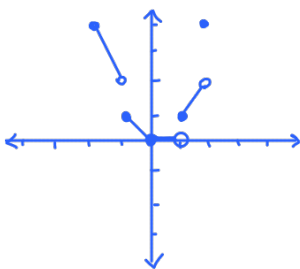
$$-2 \leq x < -1 \quad [x] = -2 \rightarrow y = -2x$$

$$-1 \leq x < 0 \quad [x] = -1 \rightarrow y = -x$$

$$0 \leq x < 1 \quad [x] = 0 \rightarrow y = 0$$

$$1 \leq x < 2 \quad [x] = 1 \rightarrow y = x$$

$$2 \leq x \quad [x] = 2 \rightarrow y = 2x$$



ب)

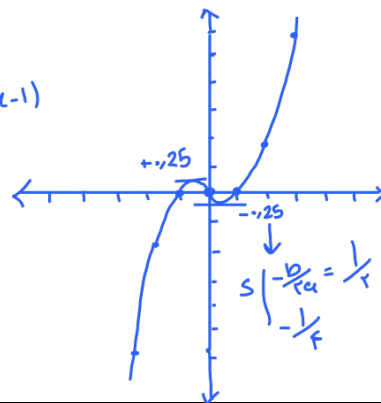
$$\text{if } x > 0 \Rightarrow x^2 - x \Rightarrow x(x-1)$$

$$\text{if } x = 0 \Rightarrow 0$$

$$\text{if } x < 0 \Rightarrow -x^2 - x$$

$$-x(x+1)$$

$$0, -1$$



۷

$$y = \frac{1}{x} + \frac{1}{x+1} + \frac{1}{x(x+1)} \Rightarrow \text{مخرج مشترک} \Rightarrow \frac{x+1+x+1}{x(x+1)} = \frac{2(x+1)}{x(x+1)}$$

$$R - \{a, b\} \Rightarrow \text{تابع به ازای } a, b \text{ تعریف نشده} \Rightarrow \text{ریشه مجزا} \Rightarrow R - \{-1, 0\} \Rightarrow a+b = -1$$

۸

$$f(x) = \frac{x - 5\sqrt{x} + 3}{x - 2\sqrt{x} + 1} \quad \frac{\sqrt{x} = t}{\textcircled{1} \text{ شیب } + \text{ شیب } -} \rightarrow \frac{t^2 - 5t + 3}{t^2 - 2t + 1} = \frac{(t-1)(t-3)}{(t-1)^2}$$

$$t \neq 1 \quad \textcircled{2} \text{ شیب } \rightarrow f(x) = \frac{t-3}{t-1} \Rightarrow f(x) = \frac{\sqrt{x}-3}{\sqrt{x}-1} \Rightarrow \frac{\sqrt{x}-1-2}{\sqrt{x}-1} = 1 - \frac{2}{\sqrt{x}-1}$$

$$\sqrt{x} = \frac{y-3}{y-1} \Rightarrow x = \frac{(y-3)^2}{(y-1)^2} \Rightarrow \underline{y = R - \{1\}}$$

برای تابع:

$$\underline{(-\infty, 1) \cup (1, +\infty)}$$

۹

$$f(x) = \frac{x^3 + 2x^2 - x - 2}{x^2 - 1} \Rightarrow \frac{x^2(x+1) - (x+2)}{(x+1)(x-1)} \Rightarrow \frac{(x+2)(x-1)}{(x+1)(x-1)} \Rightarrow f(x) = x+2 \quad \textcircled{1}$$

$$x^2 - 1 \neq 0 \Rightarrow x^2 \neq 1 \Rightarrow x \neq \pm 1 \rightarrow \begin{aligned} 1+2 &= 3 \rightarrow \text{این } 3 \text{ عدد} \\ -1+2 &= 1 \rightarrow \text{در برابری صفر} \end{aligned}$$

$$\underline{3+1=4}$$

اصطلاحی جاسناشاه

۱۰