

$$D_{f(x)} = [-2, 4]$$

$$-2 \leq \frac{3x+2}{a} \leq 4 \rightarrow -1 \leq 3x+2 \leq 4 \rightarrow -12 \leq 3x \leq 18 \rightarrow -4 \leq x \leq 4$$

$$D_{f(\frac{3x+2}{a})} = [-4, 4]$$

سوال ۱

(۲)

$$D_{f(3x-2)} = [-2, 3]$$

$$\begin{cases} 3(-2)-2 = -8 \\ 3(3)-2 = 7 \end{cases} \rightarrow D_{f(x)} = [-8, 7]$$

سوال ۲

(۲)

$$D_{f(\frac{3x+1}{2})} = [-1, 3]$$

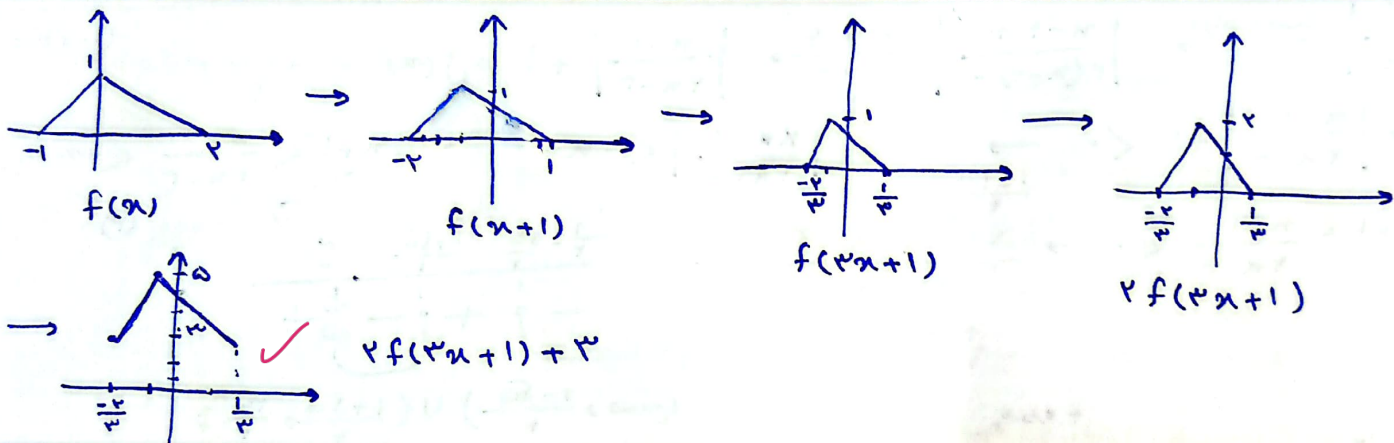
سوال ۳

(۲)

$$\begin{cases} \frac{3(-1)+1}{2} = -1 \\ \frac{3(3)+1}{2} = 5 \end{cases} \rightarrow D_{f(x)} = [-1, 5] \rightarrow -1 \leq 2-5x < 5 \rightarrow -3 \leq -5x < 3 \rightarrow \frac{-3}{-5} < x \leq \frac{3}{-5} \rightarrow D_{f(2-5x)} = (-\frac{3}{5}, \frac{3}{5}]$$

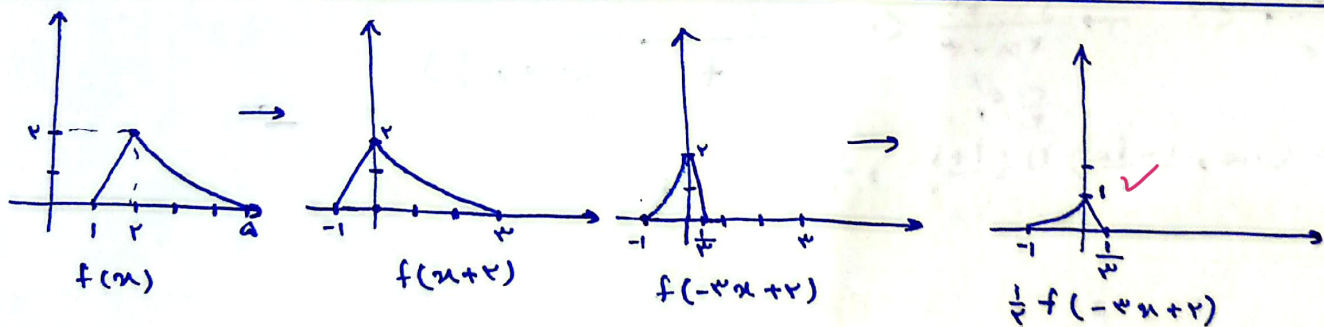
سوال ۴

(۲)



سوال ۵

(۲)



$$y = \frac{1}{3}x^2 + \frac{2}{a}x + 1 \xrightarrow{(3)} (\frac{x}{a}, \frac{28}{3a})$$

سوال ۶

(۲)

رأس تابع
جیب = (4, 3)

$$\frac{3}{a} \rightarrow 4$$

$$\frac{3}{a} + z = 4 \rightarrow z = \frac{11}{a}$$

$$\frac{28}{3a} \rightarrow 3$$

$$\frac{28}{3a} + a = 3 \rightarrow a = \frac{47}{2a}$$

$$\begin{aligned} -\frac{1}{3}x^2 + \frac{2}{a}x + 1 + \frac{47}{2a} &= 0 \xrightarrow{\times 2a} -2ax^2 + 4x - 214 = 0 \rightarrow x^2 - 2x - 107 = 0 \\ \rightarrow (x-9)(x+4) &\rightarrow x = \frac{9 \pm \sqrt{81+428}}{2} = \frac{11 \pm \sqrt{509}}{2} = 11 \pm \sqrt{509} \end{aligned}$$

سوال (۷) (۲)

$$f \text{ تابع } y_s = f \quad y_s \text{ تابع جديد} = -2(y_s) + 1 \Rightarrow -2(4) + 1 = -7 = \beta$$

$$f \text{ تابع } x_s = 1 \quad x_s \text{ تابع جديد} = \frac{x_s - 2}{3} \rightarrow \frac{1-2}{3} = -\frac{1}{3} = \alpha \quad \alpha\beta = -7 \times \frac{1}{3} = -\frac{7}{3}$$

سوال (۸) (۲)

$$D_f = (a, 4] \rightarrow D_{f(x-1)} = (a+1, 5]$$

$$D_g = [-1, b) \rightarrow D_{g(x+1)} = [-2, b-1)$$

$$y = f(x-1) + g(x+1) \quad D_y = D_{f(x-1)} \cap D_{g(x+1)} = (-2, 5)$$

$$\rightarrow D_{f(x-1)} = (-2, 5] \supset D_{g(x+1)} = [-2, 5) \rightarrow \begin{cases} a = -3 \\ b = 4 \end{cases} \quad a-b = -3-4 = -7$$

سوال (۹) (۱۱)

$$R_{y_1} = [-1, 2] \quad R_{y_2} = \sqrt{|2R_{y_1} - 3|} = \sqrt{[0, 5]} = [0, \sqrt{5}]$$

$$|2f(x) - 3| \geq 0 \rightarrow D_{y_2} = \mathbb{R}$$

صفحه آخر

سوال (۱۰) (۵)

$$f(x) = \left| \frac{x+1}{2x+1} \right| \xrightarrow{\text{بازدارنده}} \left| \frac{x-2+1}{2(x-2)+1} \right| \xrightarrow{\text{بازدارنده}} \left| \frac{x-1}{2x-3} \right| + 1 = g(x)$$

$$x + \left| \frac{x-1}{2x-3} \right| + 1 < 0 \rightarrow \left| \frac{x-1}{2x-3} \right| < -x-1 \rightarrow x+1 < \frac{x-1}{2x-3} < -x-1$$

$$\textcircled{1} \quad x+1 < \frac{x-1}{2x-3} < 0 \rightarrow \frac{x^2 - 2x - 2}{2x-3} < 0 \quad \frac{\frac{1}{2} - \frac{\sqrt{5}}{2}}{\frac{1}{2}} \quad \frac{1+\sqrt{5}}{2} \quad \frac{3}{2}$$

$$(-\infty, \frac{1-\sqrt{5}}{2}) \cup (\frac{1+\sqrt{5}}{2}, \frac{3}{2})$$

$$\textcircled{2} \quad \frac{x-1}{2x-3} < -x-1 \rightarrow \frac{2x^2 + 2}{2x-3} < 0 \quad \frac{3}{2}$$

$$\textcircled{1} \cap \textcircled{2} = (-\infty, \frac{1-\sqrt{5}}{2}) \cup (\frac{1+\sqrt{5}}{2}, \frac{3}{2})$$

صفحه آخر

$$D_{y_1} = [-3, 5] \rightarrow -3 \leq x \leq 5 \rightarrow -\frac{1}{x} \leq \frac{x}{x} + 1 \leq \frac{x}{x} \Rightarrow D_f = \left[-\frac{1}{x}, \frac{x}{x}\right]$$

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$$R_{y_1} = [-1, 2] \rightarrow -1 \leq f \leq 2 \rightarrow -5 \leq 2f - 3 \leq 1 \rightarrow 0 \leq |2f - 3| \leq 5$$

$$0 \leq \sqrt{|2f - 3|} \leq \sqrt{5} \Rightarrow R_f = [0, \sqrt{5}]$$

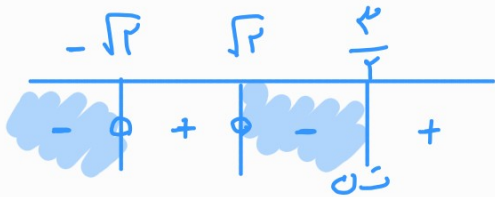
$$g(x) = \left| \frac{(x-2)+1}{2(x-2)+1} \right| + 1 = \left| \frac{x-1}{2x-3} \right| + 1$$

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از به قدر مطلق بزرگتر شده پس باید مثبت باشد: $-1-x > 0 \rightarrow x < -1$

$$x + g(x) < 0 \rightarrow \left| \frac{x-1}{2x-3} \right| < -1-x$$

$$\frac{x < -1}{\text{قدر مطلق مثبت}} \rightarrow \frac{x-1}{2x-3} < -1-x \rightarrow \frac{2x^2-4}{2x-3} < 0 \rightarrow \frac{2(x-\sqrt{2})(x+\sqrt{2})}{2x-3} < 0$$



$$\xrightarrow{x < -1} x < -\sqrt{2} \rightarrow (-\infty, -\sqrt{2})$$