

سوال ۱ (۲)

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

$$D_{f(3x+2)} = ?$$

$$-2 \leq \frac{3x+2}{3} \leq 4 \xrightarrow{\times 3} -6 \leq 3x+2 \leq 12 \xrightarrow{-2} -8 \leq 3x \leq 10 \xrightarrow{\div 3} -\frac{8}{3} \leq x \leq \frac{10}{3}$$

$$\Rightarrow D_{f(3x+2)} = [-\frac{8}{3}, \frac{10}{3}]$$

سوال ۲ (۲)

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

$$D_{f(x)} = ?$$

$$-2 \leq x \leq 3 \xrightarrow{\times 3} -6 \leq 3x \leq 9 \xrightarrow{-2} -8 \leq 3x-2 \leq 7$$

$$\Rightarrow D_{f(x)} = [-8, 7]$$

سوال ۳ (۲)

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

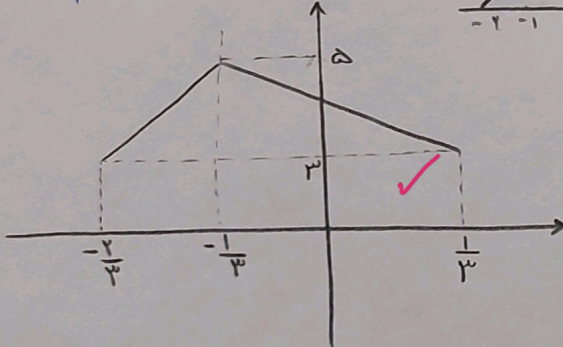
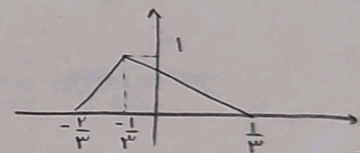
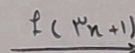
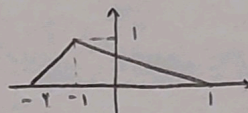
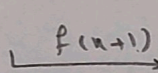
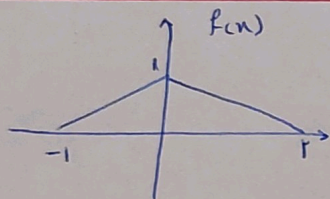
$$D_{f(2-5x)} = ?$$

$$-1 \leq x \leq 2 \xrightarrow{\times 3} -3 \leq 3x \leq 6 \xrightarrow{+1} -2 \leq 3x+1 \leq 7 \xrightarrow{\div 3} -\frac{2}{3} \leq \frac{3x+1}{3} \leq \frac{7}{3}$$

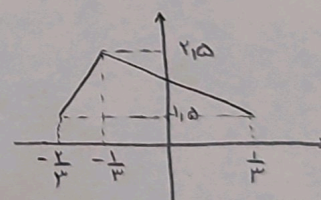
$$\Rightarrow -1 \leq 2-5x \leq 2 \xrightarrow{-2} -3 \leq -5x \leq 0 \xrightarrow{\div -5} \frac{3}{5} \geq x \geq 0 \Rightarrow D_{f(2-5x)} = (0, \frac{3}{5}]$$

سوال ۴ (۲)

$$y = 2f(3x+1) + 3$$



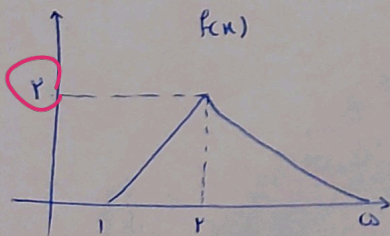
$$2f(3x+1) + 3$$



سوال ۵ (۱, ۷۵)

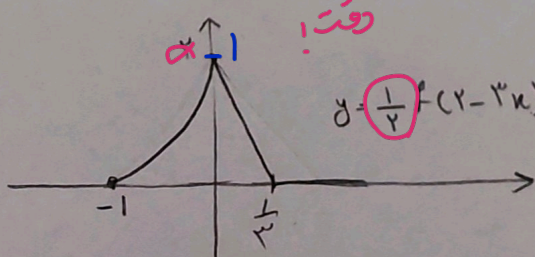
$$y = \frac{1}{3}f(2-3x)$$

$$\left| \frac{2}{3} \right| \xrightarrow{\text{متغیر}} \left| \frac{2}{3} \right|$$



$$1 \leq 2-3x \leq 3 \xrightarrow{-2} -1 \leq -3x \leq 1 \xrightarrow{\div -3} \frac{1}{3} \geq x \geq -1$$

$$\Rightarrow$$



سوال ۹ (۲)

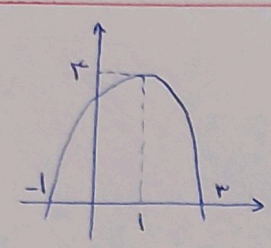
$y = -\frac{1}{3}x^2 + \frac{2}{3}x + 1$ رأس $(4, 3)$

نمودار جدید را با توجه به انتقال داریم ضرب $\Rightarrow \frac{1}{3}(x-4)^2 + 3 = 0 \Rightarrow |x-4| = \pm 3 \Rightarrow x-4 = \pm 3 \Rightarrow x = 7$ و $x = 1$

$\Rightarrow \frac{1}{3}(x-4)^2 = -3 \Rightarrow (x-4)^2 = 9 \Rightarrow x-4 = \pm 3 \Rightarrow x = 7$ و $x = 1$

سوال ۷ (۲)

$y = 1 - 2f(3x+2)$ رأس $A(a, \beta)$ $a\beta = ?$



رأس $(1, 3)$ انتقال یافته $\begin{cases} a = \frac{3-2}{3} = \frac{1}{3} \\ \beta = \frac{1-2}{1-2} = 1 \end{cases}$

$\Rightarrow a\beta = \frac{1}{3} \times 1 = \frac{1}{3}$

سوال ۸ (۲)

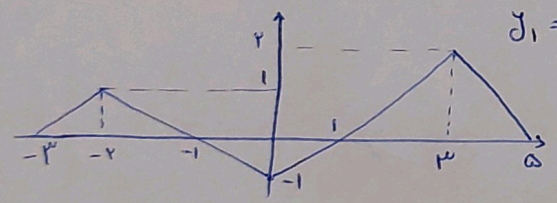
$D_f = (a, 4]$ $D_g = [-1, b)$ $y = f(x-1) + g(x+1) \rightarrow D_y = (-3, 5)$ $a-b = ?$

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

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

$(a+1, 5] \cap [-2, b-1) = (-2, 5) \Rightarrow \begin{cases} a+1 = -2 \rightarrow a = -3 \\ b-1 = 5 \rightarrow b = 6 \end{cases} \Rightarrow a-b = -3-6 = -9$

سوال ۹ (۱)



$y_1 = f(\frac{x}{2} + 1)$ $y_2 = \sqrt{12f(x) - 3}$

$\rightarrow D_{y_1} = [-3, 5] : -3 \leq \frac{x}{2} + 1 \leq 5 \xrightarrow{-1} -4 \leq \frac{x}{2} \leq 4 \xrightarrow{\times 2} -8 \leq x \leq 8$

$D_{f(x)} = [-8, 8] \Leftarrow -8 \leq x \leq 8$

$\rightarrow R_{y_1} = [-1, 2] \rightarrow R_{f(x)} = [-1, 2]$

$R_{f(x)} : [-1, 2] \rightarrow -1 \leq f(x) \leq 2 \xrightarrow{\times 2} -2 \leq 2f(x) \leq 4 \xrightarrow{-3} -5 \leq 2f(x) - 3 \leq 1$

$\xrightarrow{+1} 0 \leq 12f(x) - 3 \leq 5 \xrightarrow{\sqrt{}} 0 \leq \sqrt{12f(x) - 3} \leq \sqrt{5} \Rightarrow \begin{cases} D_{y_2} = [0, \sqrt{5}] \\ R_{y_2} = [0, \sqrt{5}] \end{cases}$

صفحه آخر

سوال ۱۰ (۲)

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

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

$\Rightarrow (1+x) + \frac{x-1}{2x-3} < 0 \Rightarrow \frac{2x^2 - 4}{2x-3} < 0 \Rightarrow \frac{2x^2 - 4}{2x-3} < 0 \Rightarrow x^2 - 2 < 0 \Rightarrow x^2 < 2 \Rightarrow x \in (-\sqrt{2}, \sqrt{2})$

$$D_{y_1} = [-r, \Delta] \rightarrow -r \leq u \leq \Delta \rightarrow -\frac{1}{r} \leq \frac{u}{r} + 1 \leq \frac{\Delta}{r} \Rightarrow D_f = \left[-\frac{1}{r}, \frac{\Delta}{r}\right]$$

-9

$$R_{y_1} = [-1, r] \rightarrow -1 \leq f \leq r \rightarrow -\Delta \leq rf - r \leq 1 \rightarrow 0 \leq |rf - r| \leq \Delta$$

$$0 \leq \sqrt{|rf - r|} \leq \sqrt{\Delta} \Rightarrow R_f = [0, \sqrt{\Delta}]$$