

۱۹, ۵

$$-1 \leq \frac{x+2}{2} \leq 1 \xrightarrow{\times 2} -1 \leq x+2 \leq 2 \Rightarrow -1-2 \leq x \leq 2-2 \Rightarrow -3 \leq x \leq 0$$

$$\Rightarrow D_{f(\frac{x+2}{2})} = [-3, 0]$$

(۲)

۱

$$\begin{aligned} & [-1, 3] \in x \\ \Rightarrow & \begin{cases} x = -1 \rightarrow \frac{x}{2} - 2 = -1 \\ x = 3 \rightarrow \frac{x}{2} - 2 = 1 \end{cases} \Rightarrow D_{f(x)} = [-1, 1] \end{aligned}$$

(۲)

۲

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

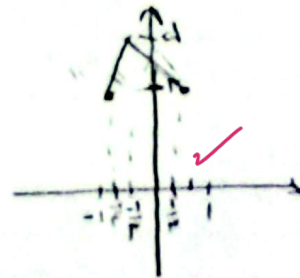
$$-1 \leq 2 - ax < 1 \Rightarrow -1 \leq -ax < 1 \Rightarrow \frac{1}{a} \leq x < \frac{2}{a}$$

$$\Rightarrow D_{f(2-ax)} = \left(-\frac{2}{a}, \frac{1}{a}\right]$$

(۲)

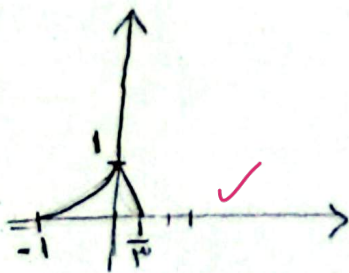
۳

$$\begin{aligned} D_{f(x)} &= [-1, 2] \Rightarrow -1 \leq \frac{x}{2} \leq 2 \Rightarrow \frac{1}{2} \leq x \leq 4 \\ R_{f(x)} &= [0, 1] \Rightarrow R_{f(x+1)} + 1 = [1, 2] \end{aligned}$$



(۲)

۴



$$\begin{aligned} 1 \leq 2 - \frac{x}{2} \leq 2 & \xrightarrow{\times 2} 2 \leq 2 - x \leq 4 \xrightarrow{-2} 0 \leq -x \leq 2 \xrightarrow{\times -1} -2 \leq x \leq 0 \\ R_{f(x)} &= [0, 1] \end{aligned}$$

(۲)

۵

$$x_5 = \frac{-b}{r_a} = \frac{-\frac{r}{a}}{\frac{1}{a}} = \frac{r}{a} \quad y_5 = \frac{1}{r} \left(\frac{q}{a} \right) + \frac{r}{a} \left(\frac{r}{a} \right) + 1 = \frac{-r}{a} + \frac{r}{a} + 1 = \frac{r}{a} \rightarrow \text{نقطه } \frac{r}{a}$$

$$y = \frac{1}{r} \left(x - \frac{r}{a} \right)^2 + \frac{r}{a} \quad \begin{matrix} x' = x - \frac{r}{a} \\ y' = y + \frac{r}{a} \end{matrix} \rightarrow y' = \frac{1}{r} (x - r)^2 + r \xrightarrow{y=0} \frac{1}{r} (x - r)^2 + r = 0$$

$$\rightarrow (x - r)^2 = -r \rightarrow |x - r| = \sqrt{r} \rightarrow x - r = \sqrt{r} \rightarrow x = r + \sqrt{r} \quad \text{و } x - r = -\sqrt{r} \rightarrow x = r - \sqrt{r}$$

$$\frac{1}{r} \rightarrow \begin{cases} x + r = 1 \rightarrow x = \frac{1}{r} \\ -r(x) + 1 \rightarrow y = -r = -\frac{1}{r} \end{cases} \Rightarrow x = \frac{1}{r} \quad y = -\frac{1}{r}$$

$$a < x - 1 < b \Rightarrow a + 1 < x < b + 1 \quad , \quad -1 < x + 1 < b \Rightarrow -2 < x < b - 1$$

$$\cap \Rightarrow (x, a) \Rightarrow \begin{matrix} b - 1 = a \Rightarrow b = a + 1 \\ a + 1 = -2 \Rightarrow a = -3 \end{matrix} \Rightarrow a - b = -3 - 4 = -7$$

$$|2f(x) - 3| \geq 0 \quad \text{برای } x \in \mathbb{R}$$

$$D_{f(x+1)} = [-2, 5] \rightarrow D_{f(x)} = \left[-\frac{1}{r}, \frac{5}{r} \right]$$

$$R_{f(x+1)} = [-1, 2] \rightarrow R_{f(x)} = [-a, 1] \xrightarrow{\text{دایره یکتا}} [1, 2] \rightarrow [1, 2]$$

$$\left| \frac{x-r+1}{r(x-r)+1} \right| + 1 = g(x) \Rightarrow g(x) = \left| \frac{x-1}{x-r} \right| + 1 \quad g(x) + x < 0 \Rightarrow \left| \frac{x-1}{x-r} \right| + 1 + x < 0$$

$$\Rightarrow x + 1 < 0 \Rightarrow x < -1 \quad \xrightarrow{\frac{x-1}{x-r}} \frac{x-1}{x-r} + x + 1 < 0 \quad \rightarrow \frac{x-1 + x^2 - rx + x - r}{x-r} < 0$$

$$\rightarrow \frac{x^2 - rx + 2x - r - 1}{x-r} < 0 \quad \frac{-\sqrt{r}}{-1} \Rightarrow (-\infty, \sqrt{r})$$

$$r_x = \{x\}$$

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

-9

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

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