

$$y = -\frac{1}{k}(x-k)^2 + 3 \quad y=0 \rightarrow -\frac{1}{k}(x-k)^2 + 3 = 0 \rightarrow (x-k)^2 = 9 \rightarrow x-k = \pm 3$$

$$\textcircled{2} \rightarrow x = 1, 7$$

$$x+k=1 \rightarrow x = -1 \rightarrow \alpha \quad y = 1 - 2f\left(3 \times \left(-\frac{1}{k}\right) + 3\right) = 1 - 2(f) = -7 \Rightarrow B$$

$$\alpha B = -\frac{1}{k} \times (-7) = \frac{7}{k} \quad \textcircled{2}$$

$$y = 3 - \sqrt{kx} \rightarrow 3 - \sqrt{k(x+1)} \rightarrow -(3 - \sqrt{k(x+1)}) \rightarrow -(3 - \sqrt{k(x+1)}) + a$$

$$= \sqrt{kx+2} + 2$$

$$\sqrt{kx+2} + 2 = \frac{3}{k} \rightarrow \sqrt{kx+2} = \frac{3}{k} \rightarrow kx+2 = \frac{9}{k^2}$$

$$\textcircled{2} \quad kx = \frac{1}{k} \rightarrow \frac{x=1}{k}$$

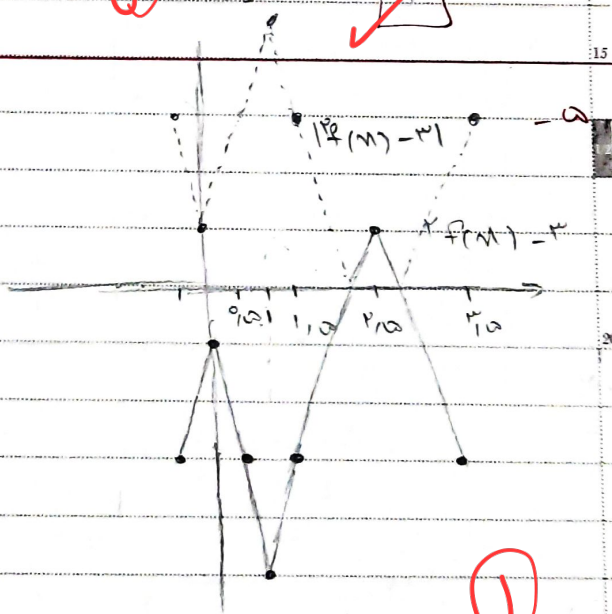
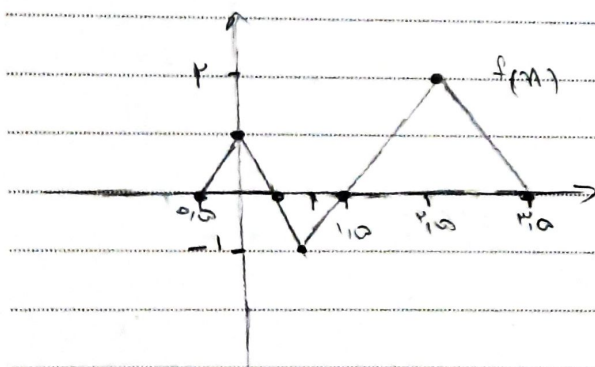
$$-1 < x < b \rightarrow -2 < x < b-1$$

$$a < x-1 < 4 \rightarrow a+1 < x < 5$$

$$\rightarrow a+1 = -2 \rightarrow a = -3$$

$$b-1 = 5 \rightarrow b = 6$$

$$\textcircled{2} \quad a-b = -3-6 = -9$$



$$y = \sqrt{2f(x)-3} \rightarrow 2f(x)-3 \geq 0$$

$$\Rightarrow D = [-0.5, 3.5]$$

$$-1 < y < 2 \rightarrow \sqrt{2y-3} \leq \sqrt{5}$$

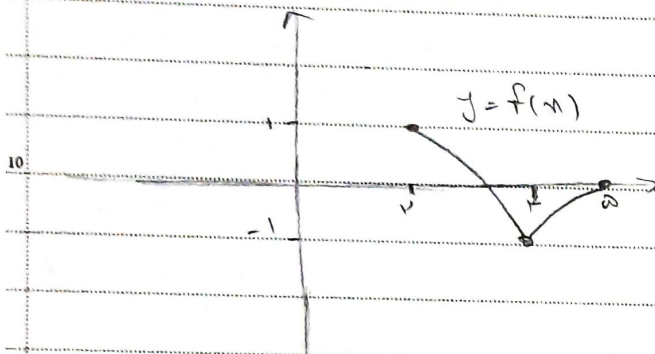
$$R_f = [0, \sqrt{5}]$$

$$y = \log_v x \rightarrow \log_v^{n-r} \rightarrow -\log_v^{n-r} \rightarrow -\log_v^{n-r} + 1^r \rightarrow -\log_v^{n-r} + 1^r = -\log_v^{n-r} + 1^r = -\log_v^{n-r} + 1^r$$

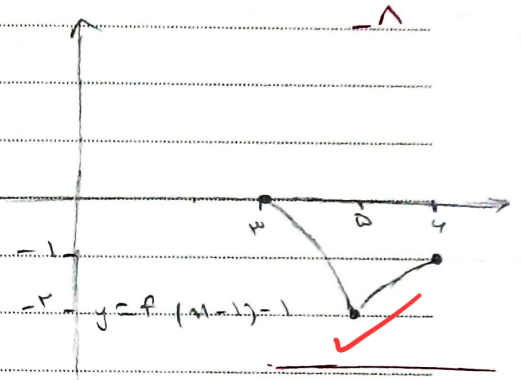
$$g(-1^r) = -\log_v^{r-(-1^r)} + 1^r = -1 \quad g(-1^r) = -\log_v^{r-(-1^r)} + 1^r = -1^r$$

$$-1 + (-1^r) = -1^r \quad \checkmark$$

(2)



(2)



$$f(x) = \left| \frac{x+1}{x-1} \right| \rightarrow \left| \frac{(x-1)+1}{x(x-1)+1} \right| + 1 \leq \left| \frac{x-1}{x-1} \right| + 1 \quad \left| \frac{x-1}{x-1} \right| + 1 + x < 4$$

$$\left| \frac{x-1}{x-1} \right| + 1 + x < 4 \rightarrow 1 + x < \frac{x-1}{x-1} + 4 - x - 1 \rightarrow -x - 1 > 0 \rightarrow x < -1$$

$$\frac{x-1}{x-1} + 1 + x < 4 \rightarrow \frac{x-1}{x-1} + 1 + x < 4 \rightarrow \frac{x-1}{x-1} + 1 + x < 4$$

$$\rightarrow -\frac{x^2 + x + 1}{x-1} > 0$$

$$-\frac{x^2 + x + 1}{x-1} > 0$$

$$\frac{1-\sqrt{5}}{2} < \frac{x}{2} < \frac{1+\sqrt{5}}{2}$$

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

$$x \in \left(\frac{1-\sqrt{5}}{2}, \frac{1+\sqrt{5}}{2} \right) \cup \left(\frac{1+\sqrt{5}}{2}, \infty \right) \rightarrow x \in \left(\frac{1-\sqrt{5}}{2}, \infty \right)$$

$$I \cap II = \left(\frac{1-\sqrt{5}}{2}, \infty \right) \quad \checkmark$$

(2)

تابع: $(x-2)^3 + 2x$

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$$g(x) = \sqrt{2x(f(x)) - f^2(x)}$$

$$\rightarrow 2x f(x) - f^2(x) \geq 0$$

$$f(x)(2x - f(x)) \geq 0$$

$$\frac{0}{-2} + \frac{2x}{2} \rightarrow f(x) \in [0, 2x]$$

$$\rightarrow 0 \leq (x-2)^3 + 2x \leq 2x$$

$$\rightarrow -2x \leq (x-2)^3 \leq 1 \rightarrow -10 \leq x-2 \leq 1$$

$$\boxed{-10 \leq x-2 \leq 1}$$

$$\boxed{-1 \leq x \leq 3}$$

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

$$D_f = [0, 1/2] \rightarrow \text{مجموعه } \mu$$