محمد عماد عطریان

۱- تا به نقطه (۴,۳) برسیم

$y = -\frac{1}{3}x^2 + \frac{2}{5}x + 1$

$\text{ext}\,\Big|\,\frac{15}{25},\ \frac{27}{25} \to -\frac{1}{3}(\underbrace{x-\frac{17}{5}}_{t})^2 + \frac{2}{5}(x-\frac{17}{5}) + 1 + \frac{47}{25}$

$-\frac{1}{3}t^2 + \frac{2}{5}t + \frac{72}{25} = 0 \Rightarrow t_1 = -\frac{12}{25}$

$\hookrightarrow t_2 = \frac{18}{5}$

$x - \frac{17}{5} = \frac{18}{5} \to \boxed{x = 7}$, $x - \frac{17}{5} = -\frac{12}{25} \to \boxed{x = 1}$

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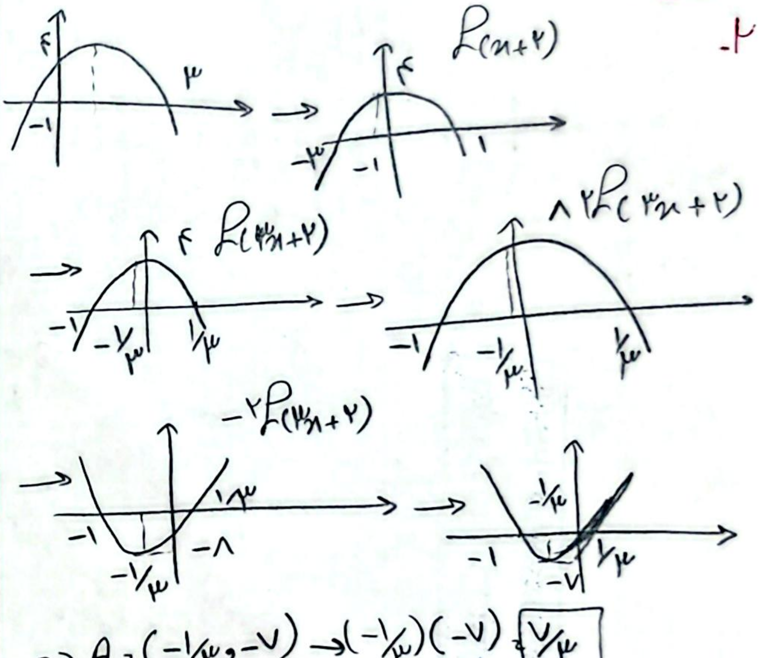
۲-



$\Rightarrow A = (-\frac{1}{3}, -7) \to (-\frac{1}{3})(-7) = \boxed{\frac{7}{3}}$

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۳-

$y = 3 - \sqrt{2x} \xrightarrow{x+1} y = 3 - \sqrt{2(x+1)}$

$\to y = 3 - \sqrt{2x+2} \xrightarrow{x-1} y = \sqrt{2x+2} - 3$

$\xrightarrow{+5} y = \sqrt{2x+2} + 2 = \frac{7}{2} \to 2x+2 = \frac{9}{4}$

$2x = \frac{1}{4} \to \boxed{x = \frac{1}{8}}$

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۴-

$D_f \Rightarrow a \le x-1 \le 4 \to a+1 \le x \le 5$

$D_g \Rightarrow -1 \le x+1 \le b \to -2 \le x \le b-1$

$\Rightarrow (-2, 5) \to a+1 = -2 \to a = -3$

$\hookrightarrow b-1 = 5 \to b = 6$

$a - b = -3 - 6 = \boxed{-9}$

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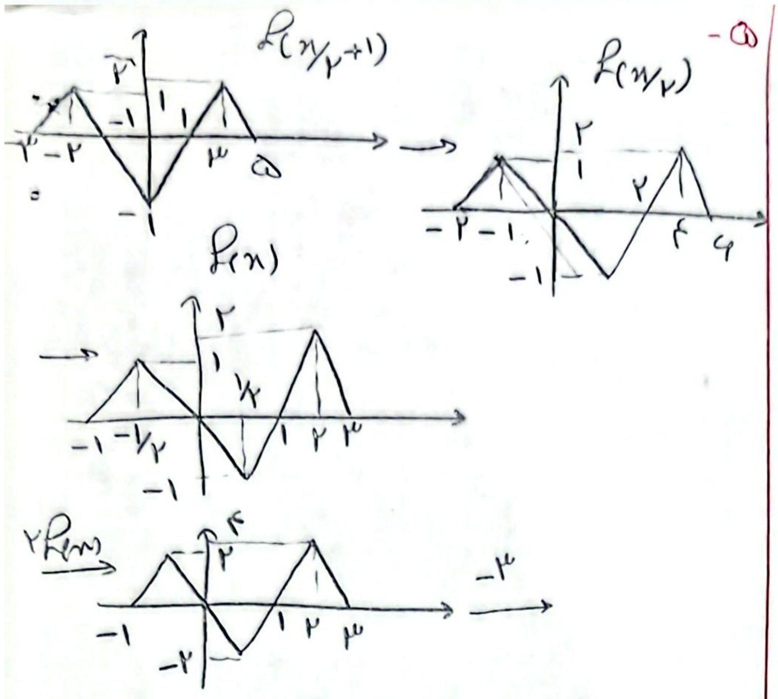
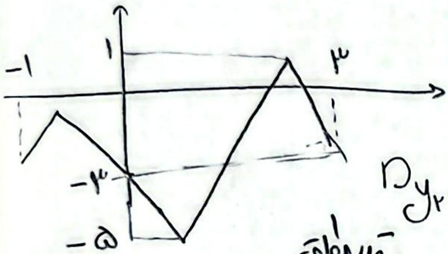
۵-





$D_{y_2} = [-1, 3]$

$D_{y_2} \to -5 \le y \le 1$

$\xrightarrow{\text{قدر مطلق}} 0 \le y \le 5$

$\xrightarrow{\sqrt{\ }} 0 \le \sqrt{y} \le \sqrt{5}$

$\Rightarrow R_{y_2} = [0, \sqrt{5}]$

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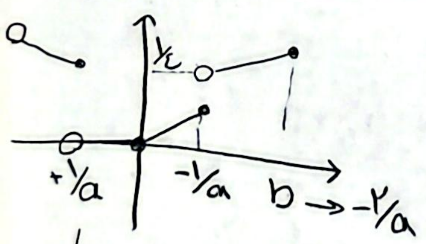
۶-



$\hookrightarrow x = \frac{1}{a} \to \frac{1}{a^2}[a \times \frac{1}{a}] \Rightarrow \frac{1}{a^2} = \frac{1}{4}$

$a = \pm 2 \to$ ۲+ قبول نیست زیرا با توجه به شکل a باید کوچکتر صفر شود.

$\Rightarrow a = -2$

$b' = 1 \to b - a = 1 - (-2) = \boxed{3}$

۷-

$$f(x)=\log_{۲}^{x} \longrightarrow \log_{۲}^{x+۲} \longrightarrow -\log_{۲}^{x+۲} \longrightarrow -\log_{۲}^{x+۲}+۳ \longrightarrow -\log_{۲}^{-x+۲}+۳$$

$$g(x)=-\log_{۲}^{x+۲}+۳$$

$$g(-۶۲) \rightarrow -\log_{۲}^{۶۴}+۳ \rightarrow \boxed{-۳}$$

$$g(-۱۴) \rightarrow -\log_{۲}^{۱۶}+۳=\boxed{-۱}$$

$$\rightarrow -۳+(-۱)=\boxed{-۴}$$

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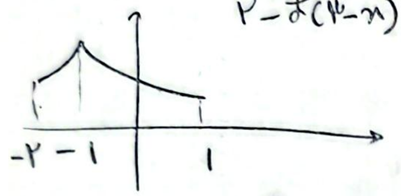
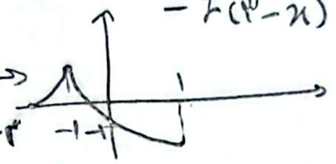
۸-

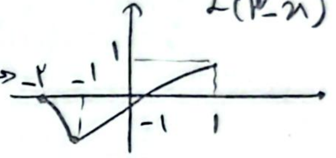
$۲-f(۳-x)$



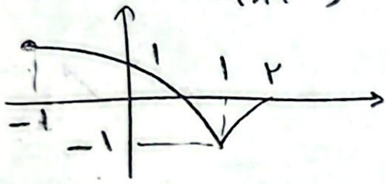
$\longrightarrow$ $-f(۳-x)$



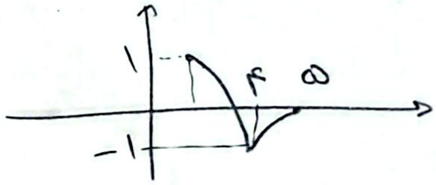
$\longrightarrow$ $f(۳-x)$



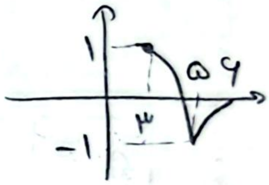
$f(x+۳)$



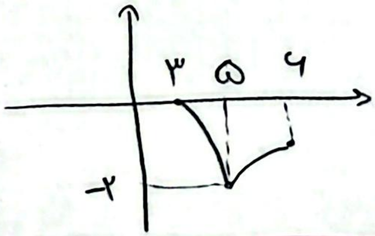
$\xrightarrow{f(x)}$



$\xrightarrow{f(x-۱)}$



$\xrightarrow{f(x-۱)-۱}$



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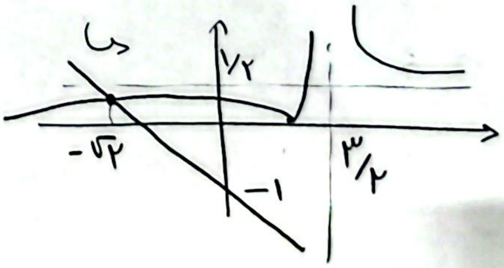
۹-

$$f(x)=\left|\frac{x+۱}{۲x+۱}\right| \longrightarrow \left|\frac{x-۲+۱}{۲x-۴+۱}\right|=\left|\frac{x-۱}{۲x-۳}\right| \rightarrow g(x)=\left|\frac{x-۱}{۲x-۳}\right|+۱$$

$$x+g(x)\geq ۰ \hookrightarrow x+\left|\frac{x+۱}{۲x-۳}\right|+۱\geq ۰ \longrightarrow \left|\frac{x-۱}{۲x-۳}\right|\geq -x-۱$$

$$\frac{x-۱}{۲x-۳}=-x-۱ \rightarrow x=\pm\sqrt{۲} \hookrightarrow \boxed{x=-\sqrt{۲}}$$



۱۵-

شکل ⟵ مبدأ تقارن است ⟵ $y = \frac{۲۷}{۸}(x-۲)^۳ + ۲۷$

$$g(x) = \sqrt{۲x(f(x)) - f(x)^۲} \rightarrow \sqrt{\underbrace{f(x)}_{t}(۲x - f(x))}$$

$$\rightarrow \sqrt{t(۲۸-t)} \rightarrow t^۲ - ۲۸t \leq ۰ \rightarrow \begin{array}{ccccc} & ۰ & & ۲۸ & \\ \hline + & | & - & | & + \end{array}$$

$$\rightarrow ۰ \leq t \leq ۲۸ \rightarrow ۰ \leq (x-۲)^۳ \frac{۲۷}{۸} + ۲۷ \leq ۲۸ \rightarrow -۲۷ \leq \frac{۲۷(x-۲)^۳}{۸} \leq ۱$$

$$\rightarrow -۸ \leq (x-۲)^۳ \leq \frac{۸}{۲۷} \rightarrow -۲ \leq x-۲ \leq ۲/۳ \longrightarrow ۰ \leq x \leq ۸/۳$$

$$\rightarrow x = \{۰, ۱, ۲\} \rightarrow \boxed{\text{۳ عدد}}$$