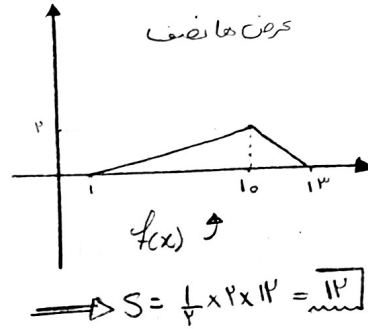
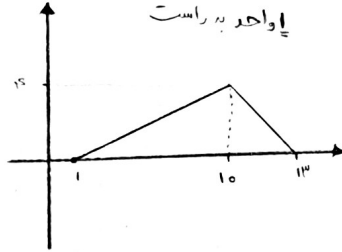
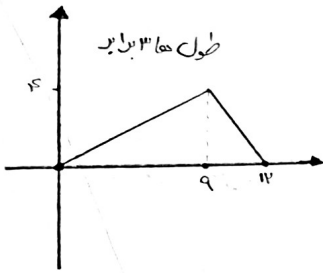


الف) $D_x f = [4, 1] \xrightarrow{\text{واحد به راست}} [1, 4] \xrightarrow{\text{طول ها برابر}} \left[-\frac{1}{10}, \frac{4}{10}\right]$

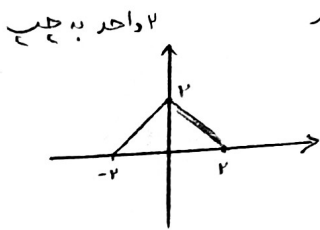
ب) $D_{f(x-2)} = [-4, 1] \xrightarrow{\text{طول ها مساوی}} [-1, 4] \xrightarrow{\text{نسبت ۱:۱۰}} D(f) = [14, -1]$

نسبت ۱:۱۰ مساوی $f(x-2) = x-2 + \sqrt{x-4} \Rightarrow y = x-2 + \sqrt{x-4} \xrightarrow{\text{نسبت ۱:۱۰}} x = y-2 + \sqrt{y-4}$
 $\Rightarrow y-2 + \sqrt{y-4} = y \Rightarrow \sqrt{y-4} = 2 \Rightarrow \boxed{y=8}$

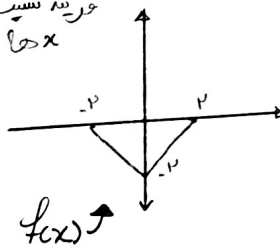


$\frac{x-a}{p} = p \Rightarrow x-a = p^2 \Rightarrow x = p^2 + a$

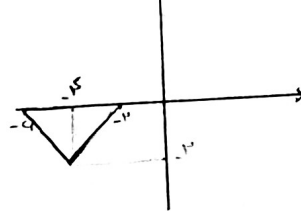
$a + \frac{p^2 - (x-a)}{p} = px - 1 \Rightarrow a - 4 = px - 1 \Rightarrow x = \frac{a+p}{p}$ $\left\{ \begin{array}{l} f+a = \frac{a+p}{p} \Rightarrow \boxed{a=-4} \end{array} \right.$



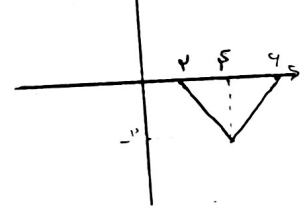
قرینه نسبت به محور x



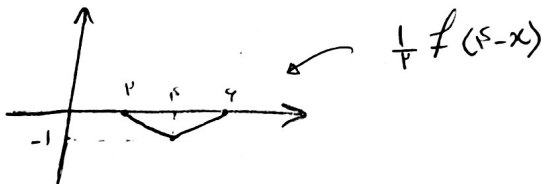
واحد به چپ

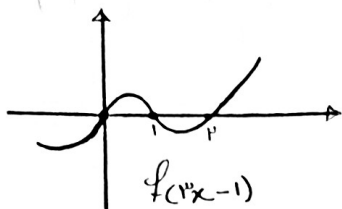


قرینه نسبت به y ها



انقباض عمودی
بضرب ۲





$$\Rightarrow -(x+1) f(1/x - 1) \geq 0 \Rightarrow (x+1) f(1/x - 1) \leq 0$$

④

	-1	0	1	2
$x+1$	-	0	+	+
$f(1/x - 1)$	-	-	0	-
$(x+1) f(1/x - 1)$	+	0	+	-

$$\Rightarrow D_{f,g} = [-1, 0] \cup [1, 2]$$

$$k > 0 \Rightarrow |1(x+k) - 1| + 1 \xrightarrow{\text{با واحد 1}} |1x + 1k - 1| - 1 = g(x)$$

⑤

$$\Rightarrow x=0 \rightarrow f(0) = 1 \Rightarrow g(0) = 1 \Rightarrow |1k - 1| - 1 = 1 \Rightarrow 1k - 1 = 2 \Rightarrow 1k = 3 \Rightarrow k = 3, \infty \checkmark$$

$1k - 1 = -2 \Rightarrow k = -1, \infty \checkmark$
با توجه به شرط اول مسئله

$$\rightarrow -\left(\frac{1x-1}{x+1}\right) \xrightarrow{\text{با واحد 1}} \frac{-1x+1}{\frac{x}{1}+1} \xrightarrow{a>0} \frac{-1x+1}{x+1} + a \rightarrow \frac{-1x+1}{x+1} + a$$

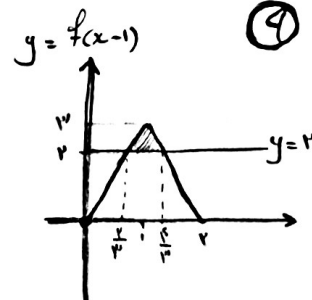
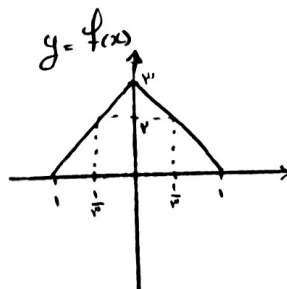
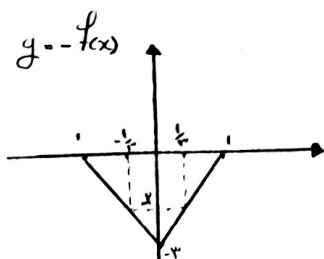
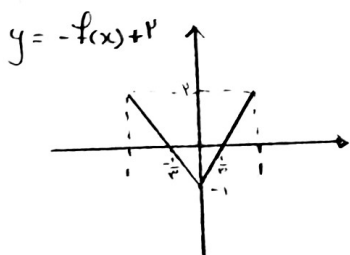
⑥

$$\Rightarrow \frac{-1x+1}{x+1} + a = \frac{1x-1}{x+1} \Rightarrow \frac{-1x+1+a(x+1)}{x+1} = \frac{1x-1}{x+1} \xrightarrow{\text{با صورت}} \frac{-x+1+ax+a}{x+1} = \frac{1x-1}{x+1}$$

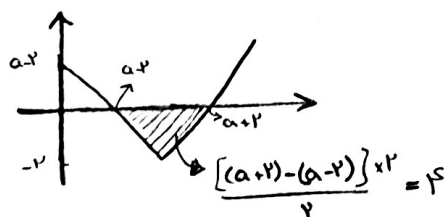
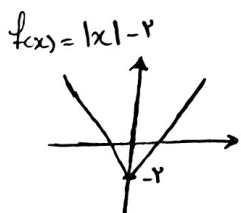
$$\xrightarrow{\text{با صورت}} \frac{1+ax+a}{x+1} = \frac{1x-1}{x+1} \Rightarrow 1x+ax^2+1+a(x+1) = 1x^2+x+1x+1 \Rightarrow (1-a)x^2+(1+a)x-1-1a$$

$$\Rightarrow \Delta = 0 \Rightarrow \frac{(1-a)^2 \pm \sqrt{1(1-a)(-1-1a)}}{1-1a} = 0 \Rightarrow 1a^2 - 1a + 111 = 0 \Rightarrow a - 1a + 111 = 0 \Rightarrow a = \frac{1+11\sqrt{11}}{2} \checkmark$$

⑦



$$\Rightarrow S = 1 \times \frac{1}{1} \times \frac{1}{1} = \frac{1}{1}$$



$$\Rightarrow \frac{(a-1)^2}{1} = \frac{4}{1} - 1 = \frac{1}{1}$$

$$\Rightarrow a \rightarrow 1 \rightarrow \text{چون در } x=1 \text{ و } x=-1 \text{ مقدار } f(x) \text{ برابر است}$$

⑧

$$\Rightarrow f\left(\frac{1}{1}\right) = \left|\frac{1}{1} - 1\right| - 1 = \frac{1}{1}$$