حسن شهبازی

۱-

الف) $D_{f(x)}=[-4,2]$ $\quad -4\le x\le 2 \quad -12\le 3x\le 6 \longrightarrow -14\le 3x-2\le 4 \quad D_{f(3x-2)}=[-14,4]$

ب) $-4\le 3x-2\le -2 \quad -2\le 3x\le 0 \quad -\frac{2}{3}\le x\le 0 \quad D_f\left[-\frac{2}{3},0\right]$

۲-

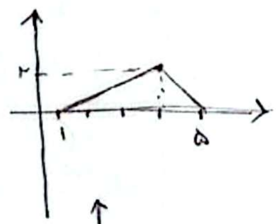
$f(x)=x+\sqrt{x-2} \to f(x-2) \Rightarrow x-2+\sqrt{x-4}=y \xrightarrow[\text{x, y جابجا}]{\text{[illegible]}} x=y-2+\sqrt{x-4}$

$y-2+\sqrt{y-4}=y \quad \sqrt{y-4}=2 \quad y-4=4$

$\boxed{y=8}$

۳-

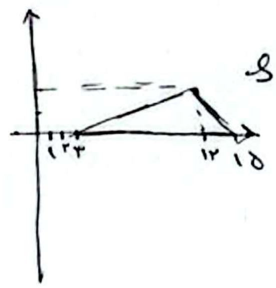
$g(x)=2f(3x+1) \xrightarrow{\div 2} f(3x+1) \longrightarrow f(3x)$



$3x\longrightarrow x$

$[1,5]\Rightarrow[3,15]$

$f(x)$



$S=\frac{12\times 2}{2}=12$

۴-

$f(2)=-3$

$f\left(\frac{x-4}{2}\right)=f(2) \quad x=a+4$

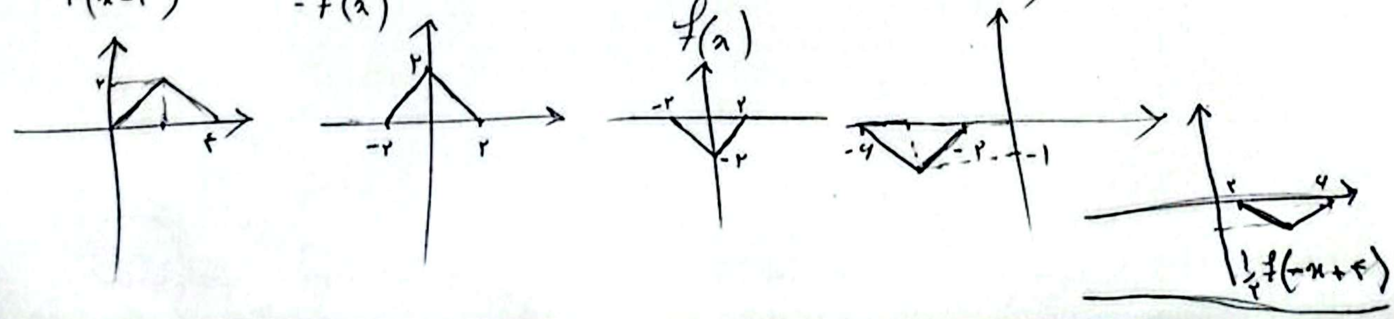
$a+2f(2)=8+2a-8$

$2f(2)=a$

$\boxed{a=-6}$

۵-

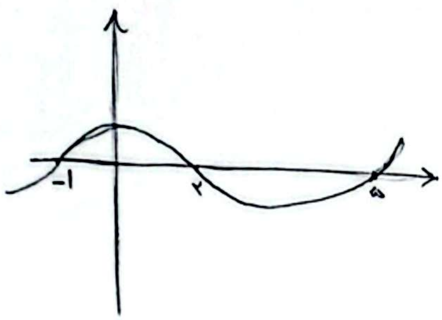
$y=-f(x-2)$ $\quad -f(x)$ $\quad f(x)$ $\quad y=\frac{1}{2}f(-x+4)$



$\frac{1}{2}f(-x+4)$

۶-

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



$$-(x+2)f(3x-1)\geq 0$$

$$(x+2)f(3x-1)\leq 0$$

	$x<-2$	-2	$-2<x<-1$	-1	$-1<x<2$	2	$2<x<5$	5	$x>5$
$f(x)$	$-$		$-$	0	$+$	0	$-$	0	$+$
$x+2$	$-$	0	$+$		$+$		$+$		$+$
A	$+$	0	$-$	0	$+$	0	$-$	0	$+$

$$D_{f'}=[-2,-1]\cup[2,5]$$

۷-

$$g(x)=|2x-3+k|+1-3=|2x-3+k|-2$$

$f(x)=g(x)$ روی محور عرض‌ها $\Longrightarrow$ $|2x-3|+1=|2x-3+k|-2$

$x=0$

$$\underbrace{\cancel{|-3|+1}}_{4}=|-3+k|-2 \qquad |-3+k|=6$$

$$-3+k=6$$

$$\boxed{\begin{array}{l}k=9\\ k=-3\end{array}}$$

$$-3+k=\pm 6$$

۸-

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

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

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

$$(x+1)(3-2x)=(2x-1)(x+3)$$

$$-2x^2+x+3=2x^2+5x-3$$

$$4x^2+4x-6=0$$

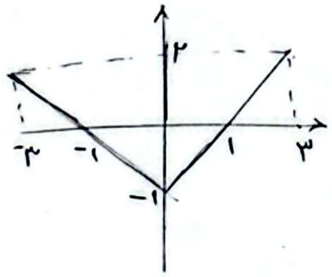
$$4x^2+4x+1=0\to\left(x+\frac{1}{2}\right)^2=0$$

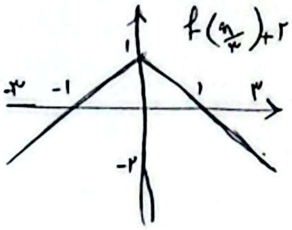
$$-6+7 \qquad 4x^2+4x-6+7=0$$

7 واحد به بالا انتقال دهیم

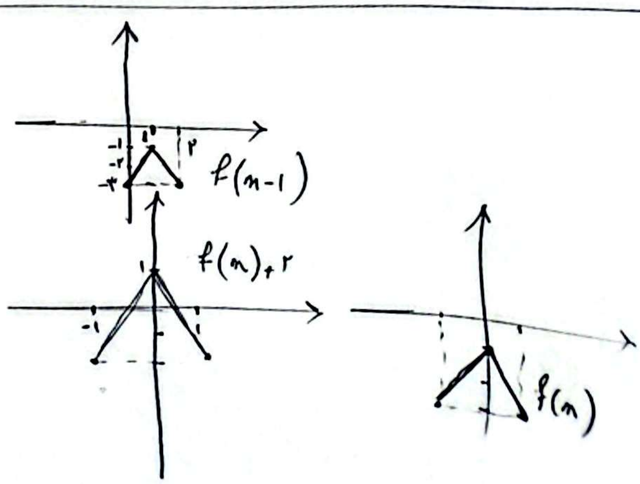
۹-

$$y_1=-f\left(\frac{x}{3}\right)+2$$

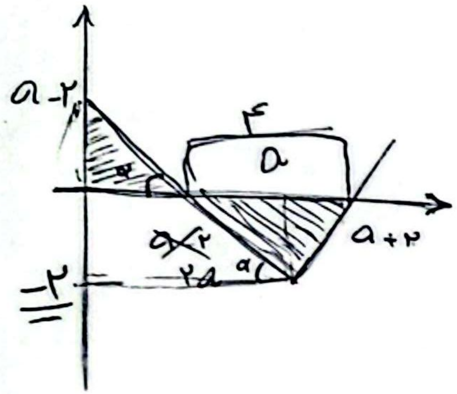




$y_2=f(x-1)$ ؟ $\Longrightarrow$



۱۰-



$$\frac{(a-2)(a-2)}{2} + \frac{4\times \cancel{2}}{\cancel{2}} = 9/2$$

$$\frac{(a-2)^2}{2} = 1/2 \quad (a-2)^2 = 1 \quad \begin{matrix} a=1 \text{ غ ق ق} \\ a=3 \text{ ق ق} \end{matrix}$$

$$f(x) = |x-3| - 2$$

$$f(1/3) = \cancel{\left|1/3 - 3\right|} - 2$$

$$\left|-\frac{8}{3}\right| - 2 = \frac{8}{3} - 6/3 = 2/3$$

$$\frac{a-2}{a-2} = \frac{a}{a}$$

$$a-2-x = a$$

$$x = -2$$

$$a+2-(a-2) = \underline{4}$$