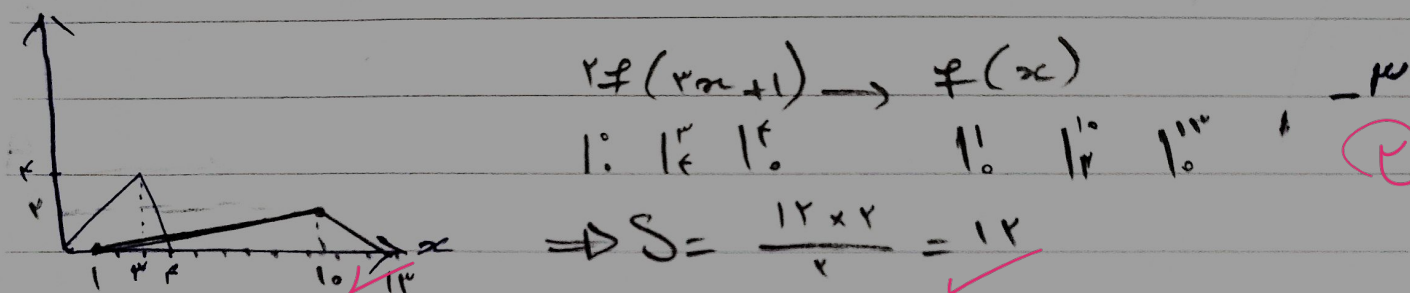
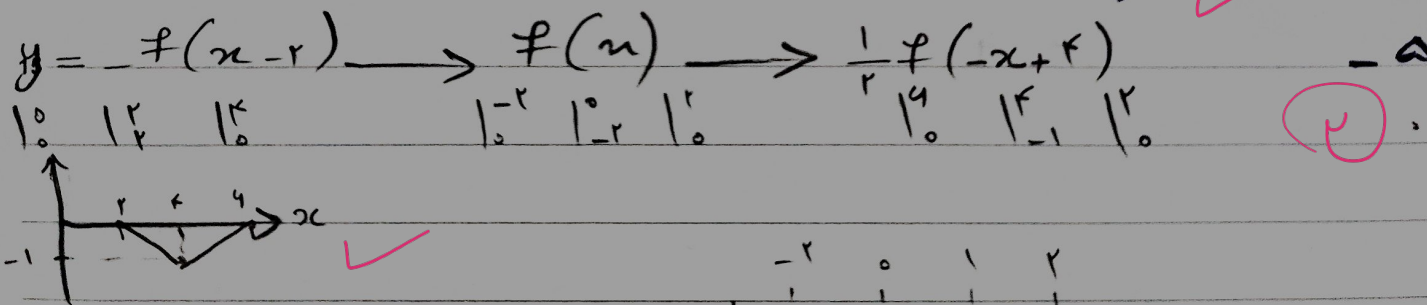


الف)  $f(x) \rightarrow f(3x-2)$   $[-4, 2] \rightarrow [-\frac{4}{3}, \frac{2}{3}]$  ب)  $[-1, -2] \rightarrow [-1, -2]$

$f(x) = x + \sqrt{x-2} \xrightarrow{\text{تغییر متغیر}} (x-2) + \sqrt{x-2}$   
 $x = y-2 + \sqrt{y-4} \xrightarrow{x=x} y-2 + \sqrt{y-4} = y \rightarrow y-4 = 4 \rightarrow y = 8$



$f(x) \xrightarrow{\text{تغییر متغیر}} f(\frac{x-a}{r}) + a$   
 $(2, -3) \xrightarrow{r=1} (2+a, -3+a) \xrightarrow{y=2x-1} -3+a = 1+2a-1 \Rightarrow a = -4$



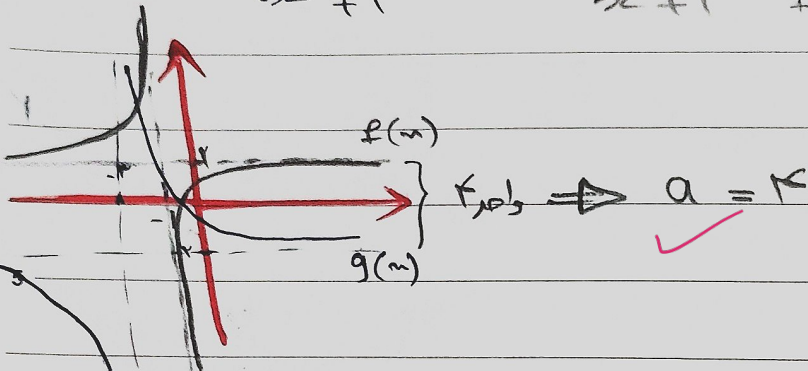
$f(x) \rightarrow f(3x-1)$

|        |    |   |   |   |   |
|--------|----|---|---|---|---|
| $x+2$  | -1 | 2 | 5 | 1 | 2 |
| $f(x)$ | -  | - | + | + | + |
| $-y$   | +  | + | - | - | - |

$D = [-2, 0] \cup [1, 2]$

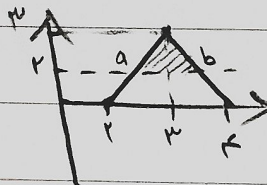
$f(x) = |2x-3| + |x-k| - 2 = g(x)$   
 $f = g \Rightarrow 4 = |2k-3| - 2 \Rightarrow \begin{cases} 2k-3 = 4 \Rightarrow k = 3.5 \\ 2k-3 = -4 \Rightarrow k = -0.5 \end{cases}$

$$f(x) = \frac{2x-1}{x+1} \xrightarrow{x \rightarrow -1} \frac{1-2x}{x+1} \xrightarrow{+a} \frac{3-2x}{x+3} + a = g(x) \quad \Delta$$



$$y = f\left(\frac{x}{3}\right) + 2 \rightarrow f(x) \rightarrow f(x-1)$$

$$\begin{matrix} 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 \\ -3 & -1 & 1 & 3 & 5 & 7 & 9 & 11 & 13 \end{matrix}$$



$$S = \frac{ab}{2} = \frac{1}{3} \Rightarrow ab = \frac{2}{3} \text{ و } S = \frac{1}{2} \times 1 = \frac{1}{2}$$

1- سه دور دو 1- است. مساحت قسمت رنگی 3 برابر

$$S = \frac{(a-r)^2}{2} \times \frac{1}{2} = \frac{4}{2} \Rightarrow (a-r)^2 = 4 \rightarrow a = \sqrt{4} + r$$

$$\frac{1}{a} = \frac{1}{\sqrt{4}+r} \times \frac{\sqrt{4}-r}{\sqrt{4}-r} = \frac{\sqrt{4}-r}{-1} = r - \sqrt{4}$$

$$\rightarrow f(r - \sqrt{4}) = |r - \sqrt{4} - \sqrt{4} - r| - 2 = r\sqrt{4} - 2 = 2(\sqrt{4} - 1)$$

$$S = \frac{(a-r)^2}{2} + \frac{2(a+r)(a-r)}{2} = \frac{9}{2} \rightarrow \frac{(a-r)^2}{2} < \frac{1}{2}$$

$$\begin{cases} a-r < 1 \rightarrow a < r \checkmark \\ a-r < -1 \rightarrow a < 1 \times \end{cases} \rightarrow f\left(\frac{1}{r}\right) = \left|\frac{1}{r} - r\right| - 2 = \frac{1}{r}$$