

1 $Df(x) = [-2, 2]$ و $Df(2x-1) = ?$ ①

2 $-2 \leq x \leq 2 \xrightarrow{+1} -1 \leq 2x-1 \leq 3 \xrightarrow{\div 2} -\frac{1}{2} \leq x \leq \frac{3}{2}$

3 $\Rightarrow Df(2x-1) = [-\frac{1}{2}, \frac{3}{2}]$

4 $Df(2x-1) = [-2, 2]$ و $Df(x) = ?$

5 $-2 \leq x \leq 2 \xrightarrow{\times 2} -4 \leq 2x \leq 4 \xrightarrow{-1} -5 \leq 2x-1 \leq 3$

6 $\Rightarrow Df(x) = [-5, 3]$

7 $f(x) = x + \sqrt{x-2}$ و $f(y) = (y-1) + \sqrt{(y-1)-2}$ ②

8 $\Rightarrow f(x) = x-2 + \sqrt{x-4}$ و $y = x-2 + \sqrt{x-4}$ و $x = y+2 + \sqrt{y-2}$

9 $y = x-2 + \sqrt{x-4} \xrightarrow{+2} y+2 = x + \sqrt{x-4}$

10 $y = \left(\sqrt{x-4} + \frac{1}{2}\right)^2 + \frac{1}{2} \xrightarrow{\sqrt{\quad}} \sqrt{y - \frac{1}{2}} = \sqrt{x-4} + \frac{1}{2}$

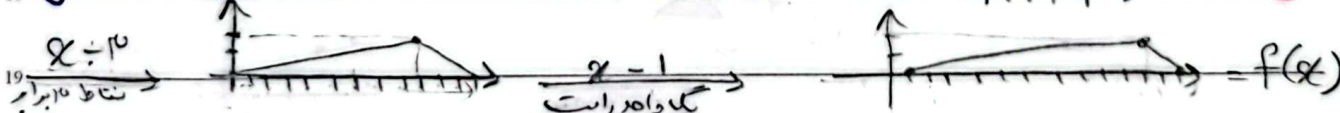
11 $\xrightarrow{-\frac{1}{2}} \sqrt{y - \frac{1}{2}} - \frac{1}{2} = \sqrt{x-4} \xrightarrow{+2} y - \frac{1}{2} + \frac{1}{2} - \sqrt{y - \frac{1}{2}} = x - 4$

12 $\xrightarrow{+4} y + \frac{1}{2} - \sqrt{y - \frac{1}{2}} = x$ و $x = y + \frac{1}{2} - \sqrt{y - \frac{1}{2}} = f^{-1}(y)$

13 $x + \frac{1}{2} - \sqrt{x - \frac{1}{2}} = x \xrightarrow{+ \frac{1}{2}} \frac{1}{2} = \sqrt{x - \frac{1}{2}} \xrightarrow{+ \frac{1}{2}} \frac{1}{2} = x - \frac{1}{2}$

14 $x = \frac{1}{2} \xrightarrow{+ \frac{1}{2}} 1 = x$ و $y = x \Rightarrow y = 1$

15 $g(x) = 2f(2x+1) \rightarrow$



17 $S = \frac{12 \times 2}{2} = 12$



Senobar

$$A(2, 1) \rightarrow y = f(x) \text{ منطبق } y = a + r f\left(\frac{x-a}{r}\right), A' \rightarrow y = 2x - 1 \quad (2)$$

$$A' \Rightarrow (x, 2x - 1) \rightarrow 2x - 1 = a + r f\left(\frac{x-a}{r}\right)$$

$$\rightarrow 2x - (1+a) = r f\left(\frac{x-a}{r}\right) \text{ و } A \rightarrow f(2) = 1$$

$$\frac{x-a}{r} = 2 \rightarrow x - a = 2r \rightarrow \begin{cases} -x + a = -2 \\ 2x - a = 1 \end{cases} \Rightarrow x = 1$$

$$\frac{2x - (1+a)}{r} = 1 \rightarrow 2x - 1 - a = r \rightarrow \begin{cases} -x + a = -2 \\ 2x - a = 1 \end{cases} \Rightarrow \begin{cases} x = 1 \\ a = 2 \end{cases}$$

$$y = -f(x-2) \Rightarrow \text{Graph of } y = -f(x-2) \text{ and } y = \frac{1}{r} f\left(\frac{x-a}{r}\right) = ? \quad (3)$$

قرینه نسبت به محور x

$$y = f(x-2) \quad x+2 \quad y = f(x)$$

$$y = f(x+2) \quad x-2 \quad y = f(-x+2)$$

$$y = \frac{1}{r} f\left(\frac{x-a}{r}\right) \rightarrow ?$$

$$y = \frac{1}{r} f\left(\frac{x-a}{r}\right) \rightarrow ?$$

$$f(x) \Rightarrow \text{Graph of } f(x) \text{ and } y = \sqrt{-(x+2)f(2x-1)} \quad (4)$$

$$f(x-1) \quad x-1 \quad f(2x-1)$$

$$\Rightarrow -(x+2) \times f(2x-1) \geq 0 \rightarrow (x+2) \times f(2x-1) \leq 0$$

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

$$\Rightarrow Df = [2, 0] \cup [1, 2]$$

Senobar

1 $f(x) = |2x - 3| + 1$ (حل برقرار روی محور است) $x=0$ (نیست) $x=0$ (است) (✓)

2 $x=0 \rightarrow f(0) = |-3| + 1 = 4 \rightarrow (0, 4)$ نقطه برقرار

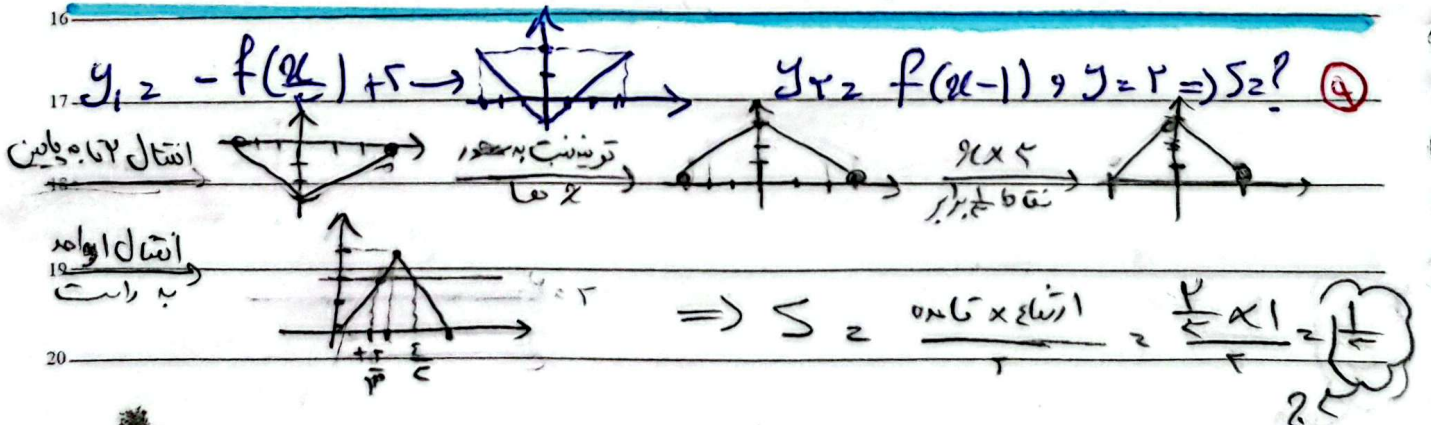
3 $x \geq \frac{3}{2} \rightarrow |2(x+k) - 3| + 1 \rightarrow |2(x+k) - 3| + 1 - 3$

4 $g(x) = |2x + 2k - 3| - 2 \rightarrow g(0) = |2k - 3| - 2 = 4$

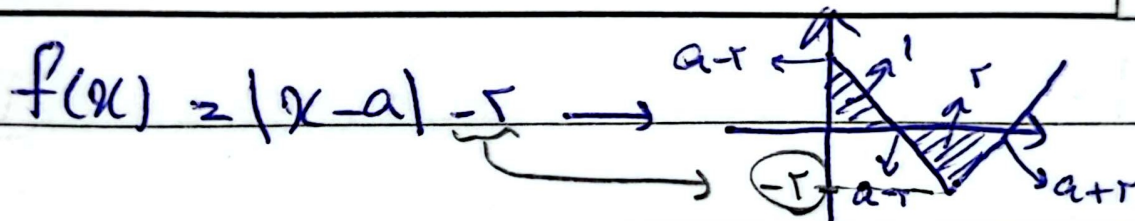
5 $k \geq \frac{3}{2} \rightarrow 2k - 3 - 2 = 4 \rightarrow k = \frac{9}{2}$
 6 $k < \frac{3}{2} \rightarrow 3 - 2k - 2 = 4 \rightarrow k = -\frac{3}{2}$
 7 $k \geq 0 \rightarrow k = \frac{9}{2} \rightarrow 2$

9 $f(x) = \frac{2x-1}{x+1} \xrightarrow{\text{مقایسه}} \frac{1-2x}{x+1} \xrightarrow{x^3 \text{ باند اول}} \frac{1 - \frac{2}{x}}{\frac{x}{x} + 1}$
 10 $= \frac{1-2x}{x+1} \xrightarrow{\text{باند دوم}} \frac{1-2x}{x+1} + a = \frac{(2a+1) + (a-2)x}{x+1}$

12 $\frac{2x-1}{x+1} = \frac{(2a+1) + (a-2)x}{x+1} \rightarrow 2x^2 + 2x - 1 = (a-2)x^2 + (2a+1)x$
 13 $(a-2)x^2 + (2a+1)x - 1 = 0$ چون اگر $\Delta = 0$ باشد $\Delta < 0$ می شود پس
 14 $a-2=0 \rightarrow a=2$ این معادله درجه ۲ می تواند باشد $\leftarrow$ نام درجه ۱ باشد
 15 $a=2 \rightarrow \Delta = 0 \rightarrow \left(\frac{-2}{1} - 1 \right) = -3$ نقطه $(-\frac{3}{2}, 1)$ برقرار نیست



Genobar



$$S_1 = \frac{(a-r) \times (a-r)}{r} = \frac{a^2 - 2ar + r^2}{r} = \frac{a^2}{r} - 2a + r$$

$$S_2 = \frac{r \times (a+r - a+r)}{r} = 2r$$

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

$$\rightarrow (a-r)^2 = 1 \rightarrow a-r = 1 \rightarrow a = r+1$$

$$\rightarrow a-r = -1 \rightarrow a = r-1 \rightarrow a-r = -1 \rightarrow \dots$$

$$f\left(\frac{1}{r}\right) = \left|\frac{1}{r} - r\right| - r = \frac{1}{r} - r - r = \frac{1}{r} - 2r$$