

$$f = [-4, 2] \rightarrow D_{f(x-2)} = ?$$

$$-4 \leq x-2 \leq 2 \rightarrow -2 \leq x \leq 4 \rightarrow \frac{-2}{3} \leq x \leq \frac{4}{3} \Rightarrow D = \left[\frac{-2}{3}, \frac{4}{3} \right]$$

$$D = [-4, 2] \rightarrow D_{f(x)} = ? \Rightarrow -4 \leq x \leq 2 \Rightarrow -12 \leq x-2 \leq -4 \Rightarrow$$

$$-12 \leq x-2 \leq -4 \Rightarrow D_{f(x)} = [-12, -4]$$

$$y = x + \sqrt{x-2}$$

$$\sqrt{x-2} = 2 \rightarrow x=6$$

$$y = \left(t + \frac{1}{t}\right)^2 + \frac{1}{t}$$

مثال ۱۰

$$y = x-2 + \sqrt{x-2}$$

$$\Rightarrow y - \frac{1}{t} = \left(t + \frac{1}{t}\right)^2 \Rightarrow$$

$$\sqrt{x-2} = t$$

$$x-2 = t^2$$

$$x = t^2 + 2$$

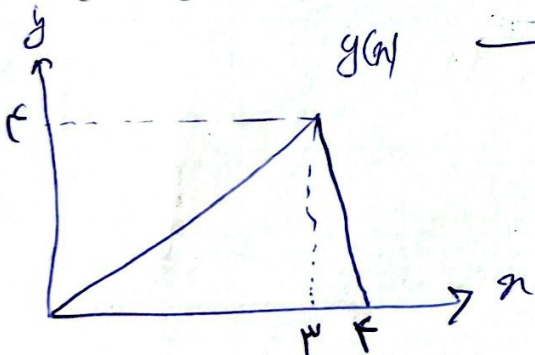
$$y = t^2 + t + \frac{1}{t} = t + t + \frac{1}{t} = 2t + \frac{1}{t} \Rightarrow$$

$$\sqrt{x-2} = \sqrt{y - \frac{1}{t}} = \sqrt{y - \frac{1}{2t + \frac{1}{t}}} = \frac{1}{2t + \frac{1}{t}} \Rightarrow$$

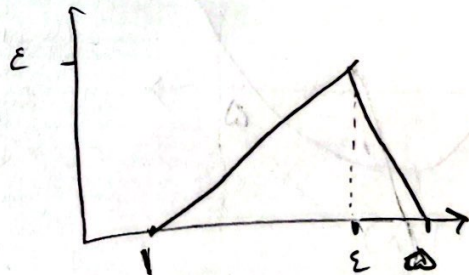
$$x = y - \frac{1}{t} + \frac{1}{t} - \sqrt{y - \frac{1}{t}} + 2 = y - \sqrt{y - \frac{1}{t}} + \frac{1}{t}$$

نشان دهیم که

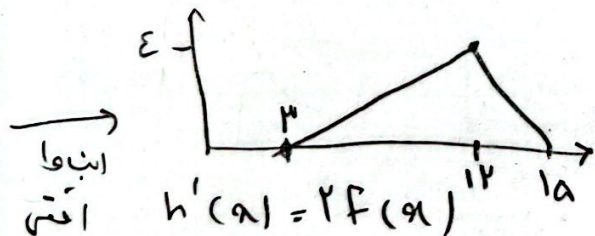
$$x - \sqrt{x - \frac{1}{t}} + \frac{1}{t} = x \Rightarrow \sqrt{x - \frac{1}{t}} = \frac{1}{t} \Rightarrow x - \frac{1}{t} = \frac{1}{t^2} \Rightarrow x = \frac{1}{t^2} + \frac{1}{t} = 1 \Rightarrow x=1 \Rightarrow y=1$$



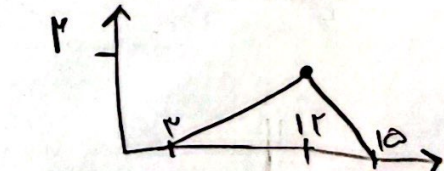
$$g(x) = 2f(3x+1)$$



$$h(x) = 2f(3x)$$



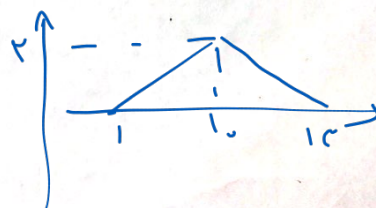
$$h'(x) = 2f(x)$$



$$L(x) = f(x)$$

$$0 \leq x \leq 2 \rightarrow 1 \leq 3x+1 \leq 7$$

$$5 < 12 \times \frac{2}{3} < 17$$



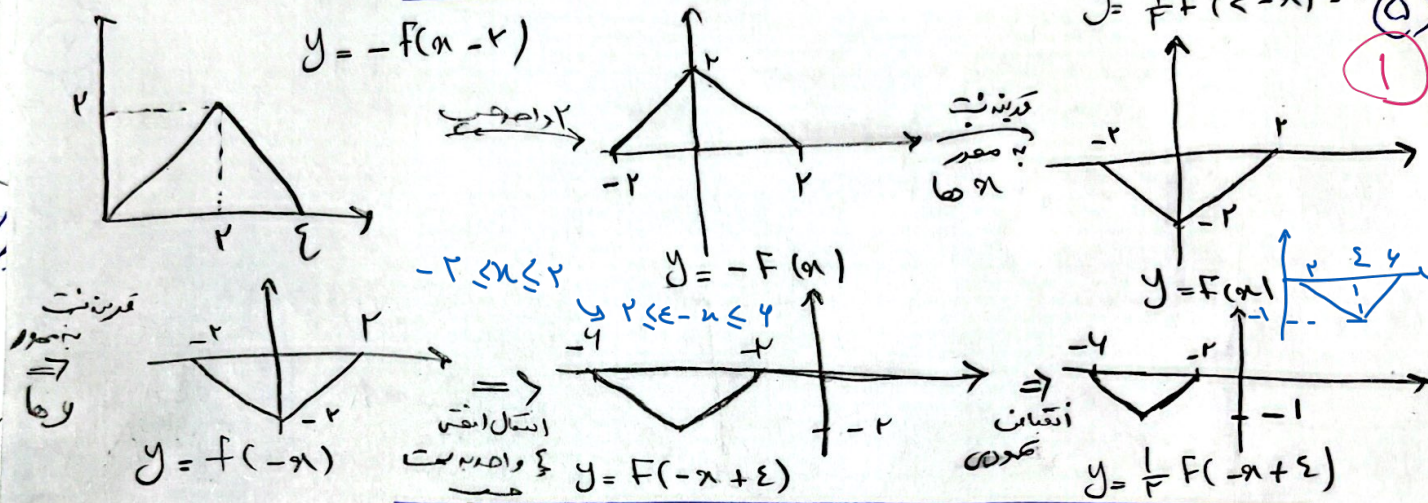
$A(2, -3) \rightarrow f(x) (x, y)$
 $A'(x', y') \rightarrow y = a + 2x \left(\frac{x-a}{2} \right)$

$* f(2) = -3$
 $x' = 2x + a$
 $y' = 2y + a$
 $x = 2 \rightarrow x' = 4 + a$
 $y = -3 \rightarrow y' = -4 + a$

$A' (x', y') \rightarrow y' = 2x' - 1 \Rightarrow 2(4 + a) - 1 = -4 + a$
 $8 + 2a - 1 = -4 + a$
 $a = -4$

$y = -f(x-2)$

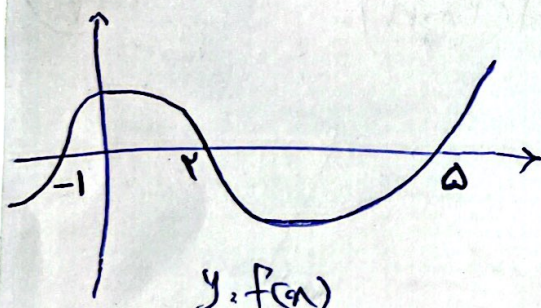
$y = \frac{1}{f} f(x-2) = ?$



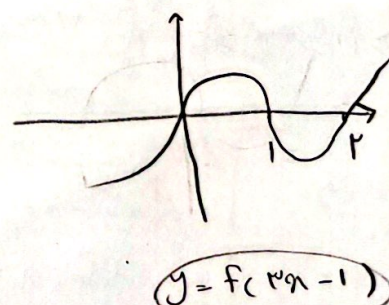
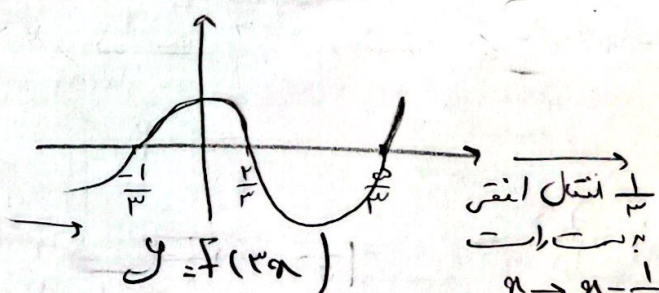
$y = \sqrt{-(x+2)f(3x-1)}$

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

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



$y = f(x)$
 $y = F(x)$



$f(3x-1) \geq 0 \rightarrow x \geq 2 \text{ or } -2 \leq x \leq 1$
 $x \leq -2$

$f(3x-1) \leq 0 \rightarrow x \leq 0 \text{ or } 1 \leq x \leq 2$
 $x > 2$
 $[-2, 0] \cup [1, 2]$

$$y = |2x-3| + 1 \xrightarrow{x \rightarrow x+k} y = |2(x+k)-3| + 1 = |2x+2k-3| + 1 \quad (7)$$

انتقال
در محور پایین

$$y'' = |2x+2k-3| - 2 = y(x) \quad (8)$$

برضوی F $\Rightarrow |2x-3| + 1 = |2x+2k-3| - 2 \xrightarrow{x=0} 2 = |2k-3| - 2 \Rightarrow |2k-3| = 4$
 $\Rightarrow 2k-3 = 4 \Rightarrow 2k = 7 \Rightarrow k = \frac{7}{2}$
 (برضوی y و 0)
 صفرات

$$f(x) = \frac{2x-1}{x+1} \xrightarrow{\text{مقلوب}} \frac{-2x+1}{x+1} \xrightarrow{\text{مقلوب نقطه}} \frac{-2x+1}{x+1} \xrightarrow{\frac{x}{x} \div 1} \frac{-2x+1}{x+1} \Rightarrow \frac{-2x+3}{x+1} \quad (9)$$

$$\frac{-2x+3}{x+1} + k = \frac{2x-1}{x+1} \Rightarrow \frac{2x-1}{x+1} + \frac{2x-3}{x+1} = k \Rightarrow \frac{(2x-1)(x+1) + (2x-3)(x+1)}{(x+1)(x+1)} = k$$

$$\Rightarrow \frac{2x^2 + 2x - 1x - 1 + 2x^2 - 3x - 3x - 3}{(x+1)^2} = k \Rightarrow \frac{4x^2 - 4x - 4}{(x+1)^2} = k \Rightarrow 4x^2 - 4x - 4 = k(x+1)^2$$

مصادف $\rightarrow k=4$

$$(4-k)x^2 + (4-4k)x - 4 - 3k = 0$$

$$\Delta = (4-4k)^2 - 4(4-k)(-4-3k) = 0 \Rightarrow 14 + 14k^2 - 32k + 16(4+k) = 0 \Rightarrow 14k^2 - 18k + 94 = 0$$

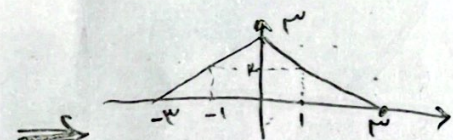
$$\Rightarrow 4k^2 - 4k + 11 = 0$$

حالت های که در دسترس نیست

① $\Delta < 0$

② $\Delta > 0$ و $x_1 < -1$

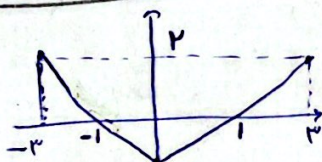
③ $\Delta > 0$ و $x_1 < -1$ $\Rightarrow -f\left(\frac{x}{k}\right) + 2 \Rightarrow$



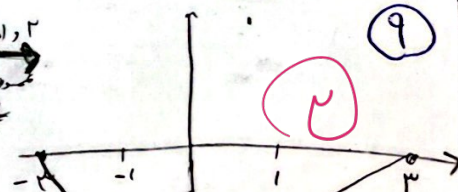
$y_2 = f\left(\frac{x}{3}\right)$

به محور
ها

$y_2 = f(x)$



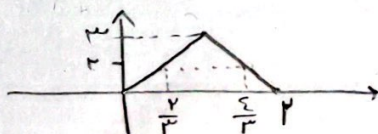
انتقال
در محور
پایین



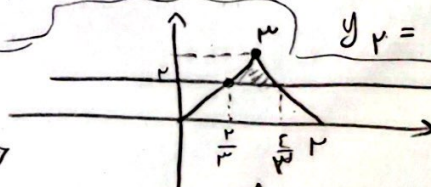
$y_2 = -f\left(\frac{x}{3}\right)$

④

$y = f(x-1)$

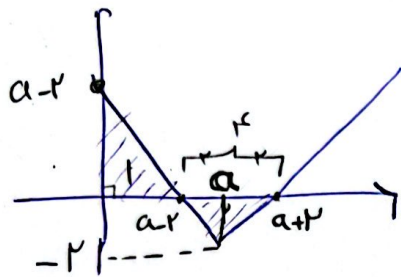


$\Rightarrow$



حواص سوال: $\frac{S_{\text{مربع}}}{S_{\text{مربع}}} = \left(\frac{2}{3} - \frac{1}{3}\right) \times 1 =$

$\frac{2}{9} = \left(\frac{1}{3}\right)^2$
 ج. ا. م. ر.



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

$$a = 3 \rightarrow f\left(\frac{1}{3}\right) = f\left(\frac{1}{3}\right) \Rightarrow f\left(\frac{1}{3}\right) = \left|\frac{1}{3} - 3\right| - 2 = \frac{1}{3} - \frac{4}{3} = -\frac{3}{3} = -1$$

$\boxed{\frac{2}{3}}$ جواب

$$S_1 = \frac{(a-r)^2}{2}, \quad S_2 = \frac{2 \times \epsilon}{2} = \epsilon$$

$$S_{\text{total}} = \frac{9}{2} = \epsilon + S_1 \Rightarrow S_1 = \frac{1}{2} \Rightarrow \epsilon = \frac{1}{2}$$

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

$$\boxed{a-r = 1 \rightarrow a = 3}$$

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