

$$f(x) \sim [-2, 2] \leadsto f(3x-2) \leadsto -2 \leq 3x-2 \leq 2 \Rightarrow$$

سؤال ① الف)

$$-2 \leq 3x \leq 2 \leadsto -\frac{2}{3} \leq x \leq \frac{2}{3} \Rightarrow Df = \left[-\frac{2}{3}, \frac{2}{3}\right]$$

$$f(3x-2) \sim [-2, 2] \xrightarrow{x^2} [-12, -4] \xrightarrow{-2} [-14, -8]$$

(=)

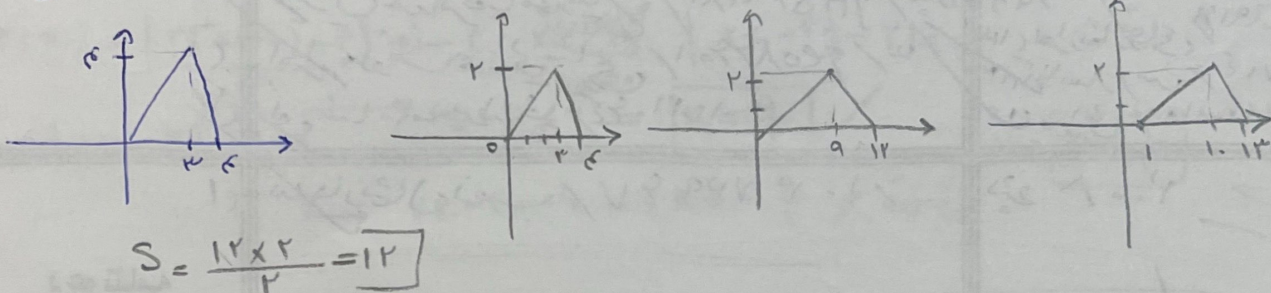
$$f(x) = x + \sqrt{x-2} \xrightarrow{x \rightarrow x-2} f(x) = x-2 + \sqrt{(x-2)-2} = x-2 + \sqrt{x-4} \quad \text{سؤال ②}$$

مرتبه شیب  $y = x^2$   $\Rightarrow$  محل برخورد در نقطه  $\Rightarrow x-2 + \sqrt{x-4} = x \Rightarrow \sqrt{x-4} = 2 \Rightarrow x = 8$

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

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

سؤال ③



$$y = f(x) \xrightarrow{A(2, -3)} -3 = f(2) \quad \frac{x-a}{r} = r \Rightarrow x-a = r$$

سؤال ④

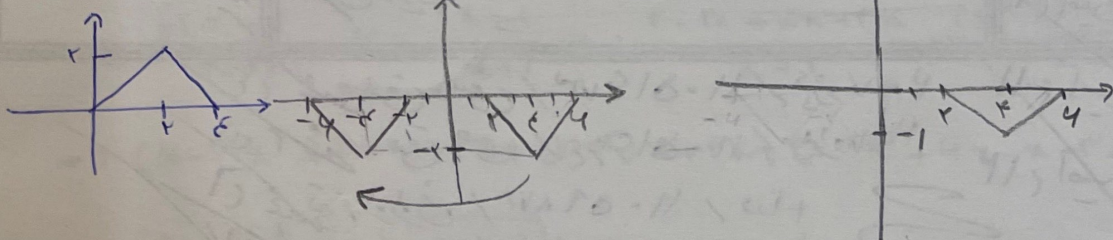
$$y = a + r f\left(\frac{x-a}{r}\right) \quad A'(x, y) \quad y = a + r(-3) \Rightarrow y = a - 4$$

$$A'(a+4, a-4) \quad y = rx - 1 \Rightarrow a-4 = r(a+4) - 1 \Rightarrow a = -4$$

$$y = -f(x-2)$$

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

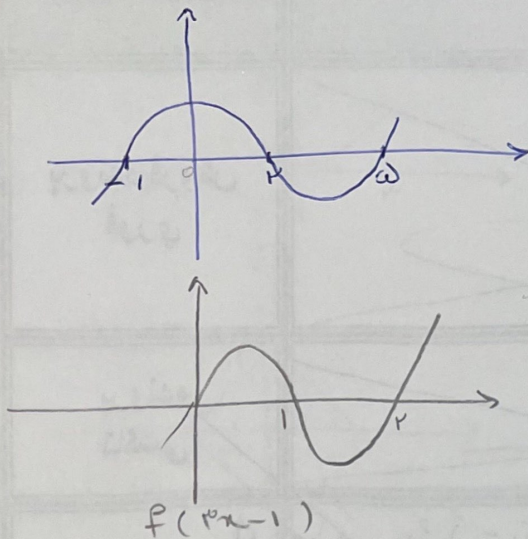
سؤال ⑤



$$y = \sqrt{-(x+r) f(rx-1)}$$

$$-(x+r) f(rx-1) \geq 0$$

سؤال ٩



$$\begin{array}{c|cccccc} & -\infty & -r & 0 & 1 & r & \\ \hline -(x+r) & + & 0 & - & - & - & - \\ \hline f(rx-1) & - & - & - & + & 0 & + \\ \hline & - & 0 & + & 0 & - & + \\ & - & 0 & + & 0 & - & + \end{array}$$

$$Df = [-r, 0] \cup [1, r]$$

$$f(x) = |rx - r| + 1 \begin{cases} rx - r + 1 = rx - r & x \geq \frac{r}{r} \\ -rx + r + 1 & x < \frac{r}{r} \end{cases}$$

سؤال ٧

$$f(x) = |r(x+k) - r| + 1 - r \xrightarrow{x=0} |rk - r| - r = f$$

$$\Rightarrow |rk - r| = 4 \xrightarrow{rk - r = 4} \boxed{k = \frac{9}{r}} \checkmark$$

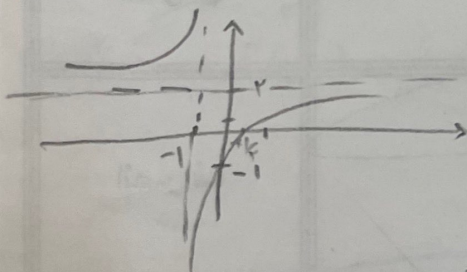
$$\Rightarrow \boxed{k = \frac{9}{r}}$$

$$\xrightarrow{rk - r = -4} k = -\frac{r}{r} \times \text{غير صحيح}$$

$$f(x) = \frac{rx-1}{x+1} \begin{cases} x = -1 & \text{ممنوع} \\ y = r & \text{ممنوع} \end{cases}$$

$$ad-bc > 0$$

سؤال ٨



$$f(x) = \frac{rx-1}{x+1} \xrightarrow{\text{مقسوم عليه}} -\left(\frac{rx-1}{x+1}\right)^{\frac{1}{r}} - \left(\frac{rx-r}{x+r}\right) + k$$

$$\Rightarrow \frac{-rx+r}{x+r} + k = \frac{rx-1}{x+1} \Rightarrow \frac{r-rx+kx+rK}{x+r} \Rightarrow \frac{(k-r)x+rK+r}{x+r} = \frac{rx-1}{x+1}$$

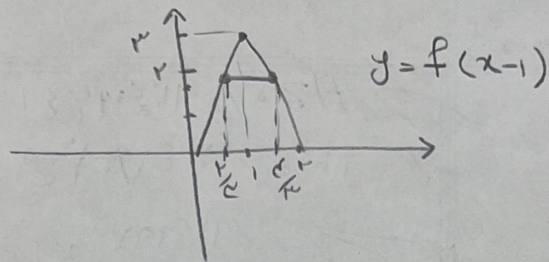
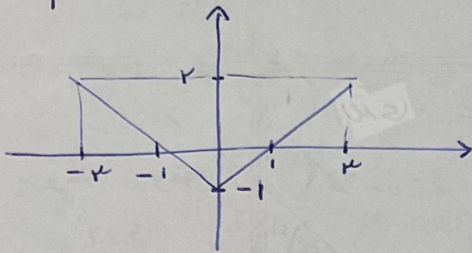
$$\Rightarrow (k-r)x^2 + rKx + rK + r = rx^2 + 4x - x - r \Rightarrow$$

$$(k-r) = r \Rightarrow \boxed{k = r}$$

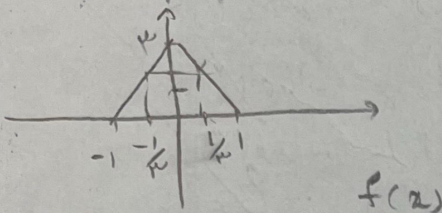
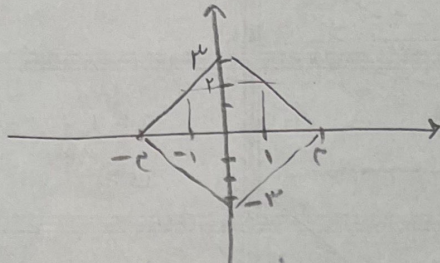
$$y = -f\left(\frac{x}{r}\right) + r$$

$$y = f(x-1)$$

سؤال ٩



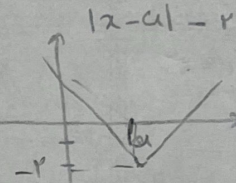
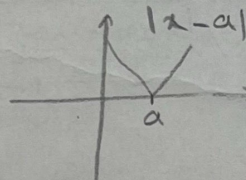
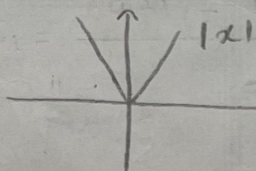
$$S = \frac{\left(\frac{r}{r} - \frac{r}{r}\right) \times r}{r} = \boxed{\frac{r}{4} = \frac{1}{r}}$$



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

سؤال ١٢

$$S_1 = \frac{(a-r)^r}{r} \quad S_r = \frac{(a+r-a+r) \times r}{r} = r \quad S_1 + S_r = \frac{(a-r)^r}{r} + r = \frac{a}{r}$$



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

$$f\left(\frac{1}{a}\right) \Rightarrow f\left(\frac{1}{r}\right)$$

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