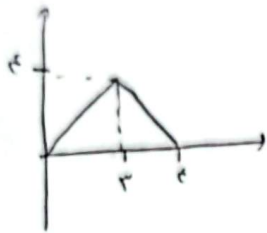


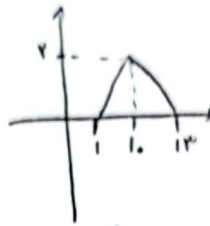
$$(x, f(x)) \xrightarrow{x \rightarrow x+1} (x+1, f(x)) \xrightarrow{f(x) \rightarrow f(x+1)} (f(x), x+1) \xrightarrow{x \rightarrow 1} (f(1), 1) = (1, 1)$$

$$f(x) = x+1 \rightarrow x + \sqrt{x-1} = x+1 \rightarrow x=1$$

$$f(1) = 1 + \sqrt{1-1} = 1$$



$$g(x) = 1 \cdot f\left(\frac{1}{2}x + 1\right)$$



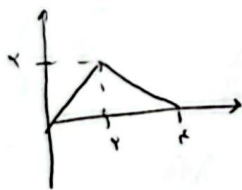
$$f(x)$$

$$S = \frac{1 \cdot 1 \cdot 1}{1} = 1$$

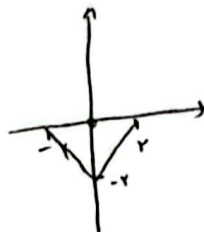
$$\frac{x-a}{r} = 1 \rightarrow x-a = r \rightarrow x = r+a$$

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

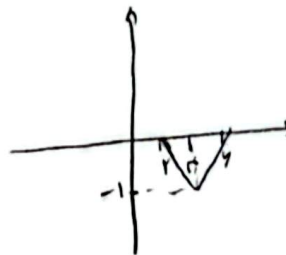
$$y = rx - 1 \quad \begin{matrix} x = r+a \\ y = a-r \end{matrix} \quad a-r = r(r+a) - 1 \rightarrow a-r = r^2 + ra - r \rightarrow \boxed{a = -r}$$



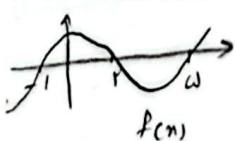
$$y = -f(x-r)$$



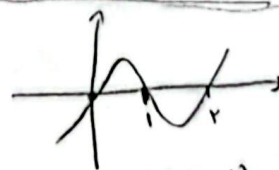
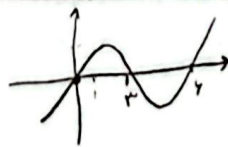
$$f(x)$$



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



$$f(x)$$



$$f(xn-1)$$

$$-(x+1)f(x-1) \geq 0 \rightarrow \begin{matrix} - & + & - & + \\ | & | & | & | \\ \hline \end{matrix} \quad D_f = [-1, 0] \cup [1, 2]$$

$$f(g(n)) = \{(r, t), (r, d)\}$$

✓

7

$$f(g(n)) = \{(1, d), (d, v), (r, t)\}$$

$$g(f(n)) = \{(r, t), (r, v)\}$$

$$g(f(n)) - f(g(n)) = \{(r, r)\}$$

✓

$$f \circ f(-\sin^2 x) \Rightarrow f(\cos^2 x) = \sin^2 x$$

$$f(x) = \begin{cases} 1-x & x \geq 0 \rightarrow 1-\cos^2 x = \sin^2 x \\ 1+x & x < 0 \rightarrow 1-\sin^2 x = \cos^2 x \end{cases}$$

1

0

$$f(n) + f(r) = 2n + r \xrightarrow{n=r} 2f(r) = 1 \rightarrow f(r) = \frac{1}{2} \rightarrow f(n) = 2n - \frac{1}{2}$$

$$f \circ f(n) = 2(2n - \frac{1}{2}) - \frac{1}{2} = 4n - \frac{3}{2} \xrightarrow{n=0} y = -\frac{3}{2}$$

9

$$f \circ g(x) = 2(x^2 - 3x + 1) - 2 = 2x^2 - 4x + 1$$

$$g \circ f(x) = (2x - 2)^2 - 2(2x - 2) + 1 = 4x^2 - 4x + 1 - 4x + 4 + 1 = 4x^2 - 8x + 6$$

$$f \circ g(x) = g \circ f(x) \rightarrow 2x^2 - 4x + 1 = 4x^2 - 8x + 6 \rightarrow 4x^2 - 4x + 5 = 0$$

$$\alpha^2 + \beta^2 = 5 - 2p = (\frac{b}{a})^2 - 2(\frac{c}{a}) = (\frac{2}{4})^2 - 2(\frac{5}{4}) = \frac{1}{4} - \frac{5}{2} = \frac{1-10}{4} = \frac{-9}{4}$$

10