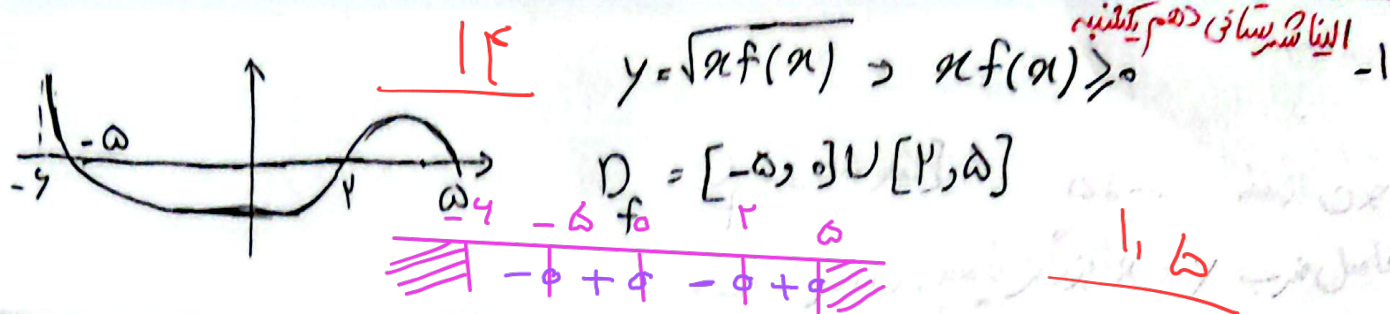
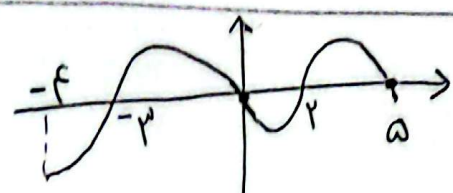




$$y = \sqrt{\frac{-x}{f(x)}}$$



$$y = \sqrt{\frac{0}{f(0)}} \checkmark$$

$$D_f = \{0\}$$

$$\frac{-x}{f(x)} \geq 0$$

$$y = \sqrt{\frac{-5}{f(5)}} \times$$

$$y = \sqrt{\frac{-2}{f(2)}} \times$$

$$y = \sqrt{\frac{+3}{f(-3)}} \times$$

$$y = \sqrt{\frac{4}{f(-4)}} \times$$

$$f(x) - 2 \cdot f(2) = x^2 - 3x + 4$$

$$f(-2) = ?$$

$$f(2) - 2 \cdot f(2) = 4 - 4 + 4$$

$$f(-2) + 4 = 4 + 4 + 4$$

$$-f(2) = -4$$

$$\checkmark \text{ (2)}$$

$$\Rightarrow f(-2) = 10$$

$$f(x) = \begin{cases} x - \sqrt{x+4} & x > 3 \\ 2x+3 & x \leq 3 \end{cases}$$

$$f(5) = 5 - \sqrt{9} = 2$$

$$f(2) = 4 + 3 = 7$$

$$f(1) = 5$$

$$f(f(5)) + f(f(1)) = ? \quad 2 + 7 = 9$$

$$\text{(2)} \checkmark$$

۵- در مورد تابع $f(x) = ax^2 - bx + 2$ و $f(x-1) - f(x) = 9x+2$ برای هر مقادیر

x برقرار است. $a-b$ را بیابید.

$$f(x-1) - f(x) = 9x+2 \Rightarrow a(x-1)^2 - b(x-1) + 2 - (ax^2 - bx + 2) = 9x+2$$

$$a + 2ax + 1 = 9x + 2 \Rightarrow a + 2ax = 9x + 1$$

$$x = 4 \text{ و } 12$$

$$a + 2ax - 9x + 1 = 0 \Rightarrow$$

$$9a = 25 \Rightarrow a = \frac{25}{9}$$

↓ صفر

$$f(x) = x^2 - 3x + 1$$

$$f(3) = 9 - 9 + 1 \Rightarrow f(3) = 1$$

-6

$$\frac{4f(3) + f(-1)}{f'(3)} = \frac{4 + 2}{(-1)^2} \cdot \left(\frac{4}{1}\right) \quad f(-1) = 1 + 3 + 1 = 2$$

$$f(3) = 9 - 9 + 1 \Rightarrow -1$$

✓

$$f(x) = \begin{cases} 3x + 1 & x \geq 2 \\ x^2 & x < 2 \end{cases} \quad f(2) = 13 \quad f(2) = 4$$

-7

$$\frac{3f(2) - 2f(-2)}{f(2)} = \frac{39 - 4}{2} = \frac{35}{2}$$

✓

$$f = \{(2, 9), (3, 2), (4, 1), (1, 9)\}$$

-1

$$\frac{f(f(4)) - f(f(3))}{f(1) - 2} = \frac{9 - 2}{4} = \frac{7}{4} = 0$$

✓

$$f(x) = \frac{x^2 + 5x + 9}{x^2 + 5x + 2}$$

-9

$$f(f(\sqrt{3} - 2)) = \frac{(\sqrt{3} - 2)^2 + 5(\sqrt{3} - 2) + 9}{(\sqrt{3} - 2)^2 + 5(\sqrt{3} - 2) + 2} = \frac{3 + 2 - 4\sqrt{3} + 5\sqrt{3} - 10 + 9}{3 + 2 - 4\sqrt{3} + 5\sqrt{3} - 10 + 2} = \frac{4 - \sqrt{3}}{2 - \sqrt{3}}$$

↓

$$f(3) = \frac{9 + 15 + 9}{9 + 15 + 2} = \frac{33}{26} = \frac{16}{13}$$

16

$$f(x) = x^2 + \frac{1}{x^2} \quad f(\sqrt{x}) = x + \frac{1}{x}$$

-10

$$(f(\sqrt{x}))^2 - f(x) = x^2 + \frac{1}{x^2} + 2 - x^2 - \frac{1}{x^2} = 2$$

✓

حالت اول: $f(n) < 0$, $n > 0$
 حالت دوم: $f(n) > 0$, $n < 0$

$$\begin{array}{ccccccc} & -4 & -3 & *0 & 1 & 2 & 3 \\ \hline & \oplus & \oplus & -\oplus & -\oplus & \oplus & \oplus \\ \hline \end{array}$$

$$D_f = (-3, 2) - \{0\}$$

۵- در ضابطه‌ی تابع به جای n مقدار $n-1$ قرار می‌دهیم:

$$f(n-1) = a(n-1)^2 - b(n-1) + 2 = an^2 - 2an - bn + a + b + 2$$

$$f(n-1) - f(n) = an^2 - 2an - bn + a + b + 2 - an^2 + bn - 2 = 4n + 2$$

$$-2an + a + b = 4n + 2 \rightarrow \begin{cases} -2a = 4 \rightarrow a = -2 \\ a + b = 2 \rightarrow b = 4 \end{cases} \rightarrow a - b = -6$$

۹- از اتحاد مربع دو جمله‌ای استفاده می‌کنیم:

$$f(n) = \frac{n^2 + 4n + 4}{n^2 + 4n + 4} = \frac{n^2 + 4n + 4 + 5}{n^2 + 4n + 4 + 1} = \frac{(n+2)^2 + 5}{(n+2)^2 + 1}$$

$$f(\sqrt{3}-2) = \frac{(\sqrt{3}-2+2)^2 + 5}{(\sqrt{3}-2+2)^2 + 1} = \frac{3 + 5}{3 + 1} = 2$$

$$f(f(\sqrt{3}-2)) = f(2) = \frac{(2+2)^2 + 5}{(2+2)^2 + 1} = \frac{21}{17}$$