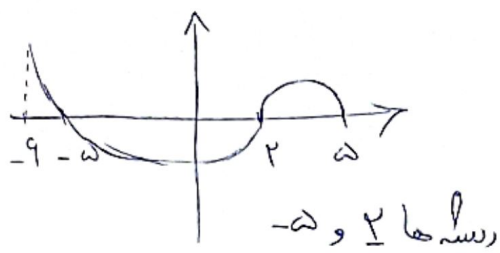


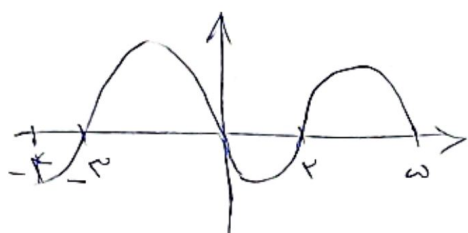
$$y = \sqrt{x f(x)} \rightarrow x \cdot f(x) \geq 0$$



$$D_f = [-5, 0] \cup [2, 5]$$

ریشه ها ۲ و -۵

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$$f(x) \neq 0$$

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

پس در مجموع دامنه این تابع
۵ عدد صحیح است.

$$D_f = [-3, 0) \cup (0, 2]$$

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$$x=2 \rightarrow f(2) - 2f(2) = 4 - 9 + 4 \rightarrow f(2) = -2$$

$$f(-2) ? \xrightarrow{x=-2} f(-2) - 2f(2) = 4 + 9 + 4 \Rightarrow \boxed{f(-2) = 10}$$

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$$f(f(5)) + f(f(1)) = ?$$

$$\begin{cases} f(5) = 5 - \sqrt{5+4} = 2 \\ f(2) = 4 + 3 = 7 \end{cases}$$

$$\underbrace{f(f(5))}_7 + \underbrace{f(f(1))}_2 = \boxed{9}$$

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$$f(1) = 2 + 3 = 5$$

$$f(5) = 5 - \sqrt{5+4} = \boxed{2}$$

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

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

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$$\Rightarrow -2ax + \underbrace{a+b}_2 = 4x + 2 \rightarrow -2a = 4 \Rightarrow \boxed{a = -2} \quad \boxed{a-b = -1} \quad \boxed{b = 1}$$

$$\frac{f'(3) + f(-1)}{f'(2)} = ? \rightarrow \frac{3+5}{\cancel{(-1)}^1} = \boxed{8}$$

$$x=3 \rightarrow f(3) = 9 - 9 + 1 = 1$$

$$x=-1 \rightarrow f(-1) = 1 + 3 + 1 = 5$$

$$x=2 \rightarrow f(2) = 4 - 9 + 1 = -4$$

$$\frac{3f(4) - 2f(-2)}{f(2)} = \frac{3(13) - 2(4)}{4} = \boxed{\frac{31}{4}}$$

$$x=4 \rightarrow f(4) = 13$$

$$x=-2 \rightarrow f(-2) = 4$$

$$x=2 \rightarrow f(2) = 4$$

$$\frac{f(f(4)) - f(f(2))}{f(2) - 2} = \frac{9 - 4}{4} = \frac{5}{4} = \boxed{\frac{5}{4}}$$

$$f(x) = \frac{x^2 + 4x + 9}{x^2 + 4x + 5} = \frac{3+4-\cancel{4\sqrt{2}} + \cancel{4\sqrt{2}} - 1 + 9}{3+5-\cancel{4\sqrt{2}} + \cancel{4\sqrt{2}} - 1 + 5} = \frac{11}{9} = \frac{11}{9}$$

$$f(f(\sqrt{2}-2)) = ? \rightarrow f(2) = ?$$

$$f(2) = \frac{4 + 8 + 9}{4 + 8 + 5} = \boxed{\frac{21}{17}}$$

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

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