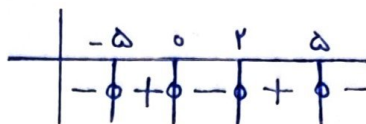
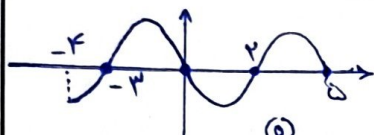


$$\sqrt{x f(x)} \rightarrow x f(x) \geq 0$$

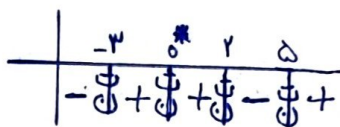


$$\Rightarrow D_f = [-5, 0] \cup [2, 5]$$

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



$$\Rightarrow D_f = (-3, 0) \cup (0, 2) \rightarrow \boxed{\text{اعداد صحیح}} \rightarrow \{-2, -1, 1\}$$

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

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

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

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$$f(1) \rightarrow 2(1) + 3 = 5 \rightarrow f(f(1)) = f(5) \rightarrow f(5) = 5 - \sqrt{5 + 4} = 2$$

$$f(5) = 2 \rightarrow f(f(5)) = f(2) \rightarrow f(2) = 2(2) + 3 = 7$$

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

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

$$f(x-1) - f(x) = 4x + 2 \rightarrow a(x-1)^2 - b(x-1) + 2 - ax^2 + bx - 2 = 4x + 2$$

$$\Rightarrow a^2 - 2ax + a - bx + b + 2 - ax^2 + bx - 2 = 4x + 2 \Rightarrow 2ax + 4x - a - b + 2 = 4x + 2 \Rightarrow (2a+4)x - a - b + 2 = 0$$

$$x \rightarrow 1 \Rightarrow 2a + 4 - a - b + 2 = 0 \Rightarrow \boxed{a - b = -6}$$

$$x \rightarrow 0 \Rightarrow -a - b + 2 = 0 \Rightarrow \boxed{a + b = 2}$$

$$2a = -6 \Rightarrow a = -3, b = 5 \Rightarrow a - b = -3 - 5 = \boxed{-8}$$

۵

$$f(x) = x^r - rx + 1$$

$$\frac{rf(r) + f(-1)}{f'(r)} = \frac{r(9 - 9 + 1) + (1 - 4 + 1)}{(r - 4 + 1)^r} = \frac{r + 0}{1} = \boxed{r}$$

6

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

$$\frac{rf(r) - rf(-r)}{f(r)} = \frac{r(r(r) + 1) - r((-r)^r)}{r(r) + 1} = \frac{rq - 1}{r} = \boxed{\frac{r-1}{r}}$$

7

$$f = \{(r, 4), (r, r), (1, 1), (1, 4)\}$$

$$\frac{f(f(r)) - f(f(r))}{f(1) - r} = \frac{f(1) - f(r)}{4 - r} = \frac{4 - 4}{r} = \frac{0}{r} = \boxed{0}$$

8

$$f(x) = \frac{x^r + rx + 9}{x^r + rx + 1} = \frac{x^r + rx + r + \Delta}{x^r + rx + r + 1} = \frac{(x+r)^r + \Delta}{(x+r)^r + 1}$$

$$f(f(\sqrt{r}-r)) = f(r) = \frac{14 + \Delta}{14} = \boxed{\frac{r-1}{r}}$$

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

9

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

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

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

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