

$x \cdot f(x) \geq 0$

$\swarrow$
 $\searrow$
 $0, 2, -5$

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

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

$\swarrow$
 $\searrow$
 $5, 2, -3$

$D_f = (-3, 0) \cup (0, 2) \rightarrow$ اعداد صحیح مانند ۱، -۱، -۲

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$$x=2 \rightarrow f(2) - 2f(2) = f - 6 + f \rightarrow -f(2) = 2 \rightarrow f(2) = -2$$

$$x=-2 \rightarrow f(-2) + 2 = 2 + 6 + 2 \rightarrow f(-2) = 10 \checkmark$$

$$\underbrace{f(f(5))}_v + \underbrace{f(f(1))}_v =$$

$v + 2 = 9 \checkmark$

$$\textcircled{1} f(5) = 5 - \sqrt{9} = 2$$

$$\textcircled{2} f(2) = \frac{v}{2}$$

$$\textcircled{1} f(1) = 5$$

$$\textcircled{2} f(5) = 5 - \sqrt{9} = 5 - 3 = 2$$

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

$$ax^2 + a - 2ax - bx + b + 2$$

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

$$\cancel{ax^2} + a - 2ax - bx + b + 2 - \cancel{ax^2} - \cancel{bx} - \cancel{a} = -2ax + a + b$$

$$a - b = -3 - 5 = -8 \checkmark$$

$$-2a = 6$$

$$a = -3$$

$$a + b = 2$$

$$b = 5$$

$$f(4) = 9 - 9 + 1 = 1$$

$$2f(4) = \frac{2}{2}$$

$$\frac{2+0}{1} = \checkmark$$

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

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

$$f^2(2) = \frac{1}{2}$$

6

$$f(f) = 14 \rightarrow 3f(f) = 42$$

$$f(-2) = 5 \rightarrow -2f(-2) = -10$$

$$f(2) = 5$$

$$\frac{42-10}{5} = \frac{32}{5} \checkmark$$

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$$f(1) = 1 \rightarrow f(1) \rightarrow 9$$

$$9-9=0 \checkmark$$

$$f(2) = 2 \rightarrow f(2) \rightarrow 9$$

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$$2^2 + 5 \cdot 2 + 9 = (\sqrt{2}-2)^2 + 5(\sqrt{2}-2) + 9 = 4 + 5 - 2\sqrt{2} + 5\sqrt{2} - 10 + 9 = 1$$

$$2^2 + 5 \cdot 2 + 0 = (\sqrt{2}-2)^2 + 5(\sqrt{2}-2) + 0 = 4 + 5 - 2\sqrt{2} + 5\sqrt{2} - 10 + 0 = 5$$

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

$$f(2) = \frac{5+1+9}{5+1+0} = \frac{15}{6} \checkmark$$

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$$x + \frac{1}{x} = \frac{x^2+1}{x}$$

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

$$\frac{x^4+2x^2+1}{x^2} = x^2 + \frac{1}{x^2}$$

$$\frac{x^4+2x^2+1-x^4}{x^2} = 2 \checkmark$$

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