

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

با x و $f(x)$ مختلف علامت باشند

صفر باشد پس:

$$D_f = (-\infty, 0) \cup (0, \infty) \rightarrow -\infty, -1, 1, \infty$$

سأحل ۳ در صحت است

✓

ابتداء به جای x ، x را هر عددی دهیم مقدار $f(x)$ برابر 1 است

$$f(x) - x[f(x) = x^2 - (x \times x) + 1 = 1]$$

$$-f(x) = x^2$$

$$f(x) = -x^2$$

حال $f(-x) - x f(x) = (-x)^2 - (x \times -x) + 1 =$

$$f(-x) = x^2 \times (-x) + 1 =$$

$$f(-x) = 1$$

$$f(\omega) = \omega - \sqrt{\omega + c} = \gamma$$

$$f(f(\omega)) = f(\gamma) = \gamma \times \gamma + \gamma = \gamma^2 + \gamma = A$$

$$f(1) = \gamma \times 1 + \gamma = \gamma$$

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

$$f(f(\omega)) + f(f(1)) = \gamma + \gamma = 2\gamma$$

$$\gamma = \frac{2\gamma}{2} = \gamma$$

Q ✓

$$f(x-1) = a \left(\frac{x-1}{x^r - r_{x+1}} \right)^r - b(x-1) + r$$

$$ax^r - rax + a - bx + b + r$$

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

$$\begin{aligned} &\rightarrow (-ra)x + (a+b) = rx + r \\ &-ra = r \rightarrow a = -r \\ &a+b = r \rightarrow -r+b = r \rightarrow b = 2r \end{aligned} \quad \left\{ \begin{aligned} a-b &= -r-2r = -3r \\ -1 &\in \mathbb{Q} \end{aligned} \right.$$

② ✓

باید x و $f(x)$ هم علامت باشند و یا یکی از آنها صفر باشد پس (حداقل صفر باشد) $\sqrt{x f(x)} \rightarrow x f(x) \geq 0$ $D_f = [-\infty, 0] \cup [2, \infty]$	۱
باید x و $f(x)$ مختلف علامت باشند و $f(x) \neq 0$ صفر باشد پس: $\frac{-x}{f(x)} \geq 0$ $D_f = (-3, 0) \cup (0, 2) \rightarrow$ شامل ۳ عدد صحیح است: ۱، -۲، -۳	۲
ابتداءً جای x، ۲ قرار می دهیم تا مقدار $f(2)$ بدست آید $f(2) - 2[f(2)] = 2^2 - (2 \times 2) + 4 = 2$ $-f(2) = 2$ $f(2) = -2$ حال $f(-2)$ را بدست می آوریم $f(-2) - 2f(2) = (-2)^2 - (2 \times -2) + 4$ $f(-2) = 2 \times (-2) + 1$ $f(-2) = 10$	۳
$f(\omega) = \omega - \sqrt{\omega + 4} = 2$ $f(f(\omega)) = f(2) = 2 \times 2 + 3 = 7$ $f(1) = 2 \times 1 + 3 = 5$ $f(f(1)) = f(5) = 5 - \sqrt{5 + 4} = 2$ $f(f(\omega)) + f(f(1)) = 7 + 2 = 9$ پس: آخر	۴
$f(x-1) = a \frac{(x-1)^2}{x^2 - 2x + 1} - b(x-1) + 2$ $ax^2 - 2ax + a - bx + b + 2$ $f(x-1) - f(x) = ax^2 - 2ax + a - bx + b + 2 - ax^2 + bx - 2 = (-2a)x + (a+b)$ $(-2a)x + (a+b) = 2x + 2$ $-2a = 2 \rightarrow a = -1$ $a+b = 2 \rightarrow -1+b = 2 \rightarrow b = 3$ $a-b = -1-3 = -4$ پس: -4	۵

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$$\lambda = \frac{1}{1 + \lambda} = \frac{(\lambda)_+}{(1)_+ + (\lambda)_+}$$

$$1 = (1)_+ = [(\lambda)_+] = (\lambda)_+ +$$

$$1 = 1 + (\lambda)_+ - \lambda = (\lambda)_+ +$$

$$0 = 1 + (-) - \lambda = (1)_+ +$$

$$1 = 1 + \lambda - \lambda = (\lambda)_+ +$$

1

$$\frac{\frac{\lambda}{1-\lambda}}{\lambda - \lambda^2} = \frac{\lambda}{\lambda(1-\lambda)} = \frac{1}{1-\lambda}$$

λ (pointing to the boxed fraction)

$$\begin{aligned} \lambda &= 1 + \lambda^2 = (1) + \\ \lambda &= 1 - \lambda^2 = (1) - \\ \lambda &= 1 + \lambda^2 = (1) + \end{aligned}$$

$$0 = \frac{\lambda - \kappa}{\kappa - \lambda} = \frac{\lambda - (1) \downarrow}{((\kappa) \downarrow) \downarrow - ((\lambda) \downarrow) \downarrow}$$

$$\boxed{\kappa} = (1) \downarrow = ((\kappa) \downarrow) \downarrow$$

$$\lambda = (1) \downarrow$$

$$\boxed{\kappa} = (1) \downarrow = ((\kappa) \downarrow) \downarrow$$

$$1 = (\kappa) \downarrow$$

$$\left[\frac{V}{I} \right] = \frac{m + (\lambda) \cancel{r} + \lambda^2}{b + (\lambda) \cancel{r} + \lambda^2} = (\lambda) f = ((\lambda - \cancel{m}) \cancel{r}) f$$

$$\lambda = \frac{\cancel{r}}{V} = \frac{m + \cancel{r} - \cancel{m} \cancel{r} + \cancel{r} + \cancel{m} \cancel{r} - \cancel{m}}{b + \cancel{r} - \cancel{m} \cancel{r} + \cancel{r} + \cancel{m} \cancel{r} - \cancel{m}} = \frac{m + (\lambda - \cancel{m}) \cancel{r} + (\lambda - \cancel{m})}{b + (\lambda - \cancel{m}) \cancel{r} + (\lambda - \cancel{m})} = (\lambda - \cancel{m}) f$$

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

$$(f(\sqrt{q}))^r - f(q) = (q^r + \frac{1}{q^r})^r - (q^r + \frac{1}{q^r}) = q^{r^2} + \frac{1}{q^{r^2}} - q^r - \frac{1}{q^r} = \left[\frac{q^{r^2}}{q^r} - \frac{1}{q^r} \right]$$

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

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

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

$$f^2(x) = [f(x)]^2 = (-1)^2 = 1$$

$$\frac{f(f(x)) + f(-1)}{f^2(x)} = \frac{1 + 3}{1} = 4$$

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$$f(x) = x + 1 = 3$$

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

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

$$\frac{f(f(x)) - f(-2)}{f(x)} = \frac{3 - (-1)}{3} = \frac{4}{3}$$

$$\boxed{\frac{4}{3}}$$

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$$f(x) = 1$$

$$f(f(x)) = f(1) = 4$$

$$f(3) = 2$$

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

$$\frac{f(f(x)) - f(f(x))}{f(1) - 2} = \frac{4 - 4}{4 - 2} = 0$$

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$$f(\sqrt{x}) = \frac{(\sqrt{x}-1)^2 + f(\sqrt{x}-1) + 9}{(\sqrt{x}-1)^2 + f(\sqrt{x}-1) + 1} = \frac{1}{1} = 1$$

$$f(f(\sqrt{x}-1)) = f(x) = \frac{x^2 + f(x) + 9}{x^2 + f(x) + 1} = \boxed{\frac{1}{1}}$$

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

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

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