

نام و نام خانوادگی نشانی پاسخنامه تشریحی تکلیف شماره (۴) ... کلاس ... (R) ...

الف) $\frac{x-1}{x} - \frac{x}{x-1} = \frac{(x-1)^2 - x^2}{x(x-1)} = \frac{x^2 - 2x + 1 - x^2}{x(x-1)} = \frac{-2x + 1}{x(x-1)} \geq 0$

$\Rightarrow D_f = (-\infty, 0) \cup (\frac{1}{2}, 1)$

ب) $x+1 \neq 0 \Rightarrow x \neq -1$, $x \neq 0$, $x-1 \neq 0 \Rightarrow x \neq 1$, $x+2 \neq 0 \Rightarrow x \neq -2$

$\frac{x}{x-1} + \frac{1}{x+2} = \frac{x^2 + x + x - 1}{(x-1)(x+2)} = \frac{x^2 + 2x - 1}{(x-1)(x+2)} \neq 0 \Rightarrow x^2 + 2x - 1 \neq 0$

$\Rightarrow D_f = \mathbb{R} - \{-1, 0, 1, -2, \frac{-2 \pm \sqrt{4+4}}{2}\}$

الف) $((\frac{1}{x})^x - 1)(x^2 - 4) \geq 0$: روشها : $(\frac{1}{x})^x - 1 = 0 \Rightarrow (\frac{1}{x})^x = 1 \Rightarrow x = -2$

$x^2 - 4 = 0 \Rightarrow x = \pm 2 \Rightarrow x = \frac{0}{2}$

$\Rightarrow D_f = (-\infty, -2) \cup (\frac{0}{2}, +\infty)$

ب) $\sqrt{x+1} = x - \sqrt{x-1} \Rightarrow x - \sqrt{x-1} \geq 0 \Rightarrow \sqrt{x-1} \leq x \Rightarrow x-1 \leq x^2 \Rightarrow x \leq x^2$

$x-1 \geq 0 \Rightarrow x \geq 1$ $D_f = [1, +\infty)$

I) $x^2 - x - 2 > 0 \Rightarrow (x-2)(x+1) > 0$ $\Rightarrow D_1 = (-\infty, -1) \cup (2, +\infty)$

II) $x^2 - 1 \geq 0 \Rightarrow (x-1)(x+1) \geq 0 \Rightarrow D_2 = (-\infty, -1] \cup [1, +\infty)$

$D_f = D_1 \cap D_2 = (-\infty, -1) \cup (2, +\infty)$

$x^2 + ax - x^2 \geq 0$: ضریب x^2 به ازای -2 : $x^2 - 2a - 4 = -1 - 2a = 0 \Rightarrow a = -1 \Rightarrow a = \frac{-1}{2}$

ب به ازای b : $x^2 - \frac{1}{2}b - b^2 = 0 \Rightarrow 12 - 2b - 4b^2 = 0$

$\Rightarrow 4b^2 + 2b - 12 = 0 = (2b+4)(2b-3) \Rightarrow b = -2, \frac{3}{2}$

چون : $b > -2 \Rightarrow b = \frac{3}{2}$ $a+b = \frac{3}{2} - \frac{1}{2} = 1$

$f(x) - x \geq 0$: $x \geq 1 : x^2 - 2 - x \geq 0 \Rightarrow x^2 - 2 \geq 0 \Rightarrow x \geq \sqrt{2} \rightarrow x \geq 1$ (I)

$x < 1 : x^2 + 4 - 2 \geq 0 \Rightarrow x^2 + 2 \geq 0 \Rightarrow x \geq -\sqrt{2} \rightarrow -\sqrt{2} \leq x < 1$ (II)

$\Rightarrow D_g = D_1 \cup D_2 = [-\sqrt{2}, +\infty)$

$$f(\omega) = (a+1)(\omega+r) = v(a+1) = va+v$$

$$f(-r) = ra + r(-r) = ra - r$$

$$r(va+v) = (ra-r) + a \Rightarrow 1fa + 1f = fa - f \Rightarrow 10a = -1 \rightarrow a = -\frac{1}{a}$$

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$$r - \sqrt{r} = x, \quad \frac{1}{x} = \frac{1}{r - \sqrt{r}} \cdot \frac{r + \sqrt{r}}{r + \sqrt{r}} = \frac{r + \sqrt{r}}{r - r} = r + \sqrt{r}$$

$$\left(\sqrt{r - \sqrt{r}} + \frac{1}{\sqrt{r - \sqrt{r}}} + r \right) + \left(\sqrt{r + \sqrt{r}} + \frac{1}{\sqrt{r + \sqrt{r}}} + r \right) = r(\sqrt{r + \sqrt{r}} + \sqrt{r - \sqrt{r}} + r)$$

$$(\sqrt{r + \sqrt{r}} + \sqrt{r - \sqrt{r}})^2 = r + \sqrt{r} + r - \sqrt{r} + r(\sqrt{r + \sqrt{r}} + \sqrt{r - \sqrt{r}}) = 4 \Rightarrow \sqrt{r + \sqrt{r}} + \sqrt{r - \sqrt{r}} = \pm 2 \rightarrow \sqrt{r + \sqrt{r}} + \sqrt{r - \sqrt{r}} = 2$$

$$\Rightarrow r(\sqrt{4} + r) = \sqrt{4} + r$$

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$$r \times (rf(x) - rf(-x)) = rx' - x$$

$$r \times (rf(-x) - rf(x)) = rx' + x$$

$$\Rightarrow \left. \begin{aligned} rf(x) - rf(-x) &= rx' - x \\ rf(-x) - rf(x) &= rx' + x \end{aligned} \right\} \Rightarrow \begin{aligned} -2rf(x) &= rx' - x \\ -2rf(x) &= rx' + x \end{aligned} \Rightarrow \begin{aligned} -2rf(x) &= rx' + x \\ -2rf(x) &= rx' + x \end{aligned} \Rightarrow f(x) = -rx' - \frac{x}{2}$$

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$$x=0 : rf(0) = rm - 1$$

$$x=-r : -r(-r)f(0) = rf(0) = f(-r)^r - m(-r) + rm - 1 = 1 + rm - rm - 1 = 1 + 2m$$

$$rf(0) = \frac{rm - 1}{r} = \frac{1 + 2m}{r} \Rightarrow rm - 1 = 1 + 2m \Rightarrow rm = 2 \Rightarrow m = \frac{2}{r}$$

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

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$$f(x) + f\left(\frac{1}{x}\right) = ax + b + \frac{a}{x} + b = ax + \frac{a}{x} + rb = \frac{rx^2 - 1rx + r}{x} = rx - 1r + \frac{r}{x}$$

$$\Rightarrow a = r, rb = -1r \Rightarrow b = -1 \Rightarrow f(x) = rx - 1$$

$$f(-1) = r(-1) - 1 = -r - 1$$

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