تکلیف شماره ۴ — ریاضی — یازدهم تجربی

۱۸/۲۵

①

الف) $f(x)=\sqrt{\dfrac{x-1}{x}-\dfrac{x}{x-1}}$ $\quad x\neq 0$ و $x-1\neq 0 \rightarrow x\neq 1$

$=\dfrac{\cancel{x^2}+1-2x-\cancel{x^2}}{x(x-1)}=\dfrac{1-2x}{x(x-1)}\geq 0$ $\quad 1-2x \rightarrow \frac{1}{2}$

0	$\frac{1}{2}$	1
+ ∅	− ∅	+ ∅

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

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ب) $f(x)=\dfrac{\dfrac{1}{x+1}-\dfrac{2}{x}}{\dfrac{3}{x-1}+\dfrac{1}{x+2}}$ $\rightarrow x+1\neq 0 \rightarrow x\neq -1$ ، $x\neq 0$

$\rightarrow x-1\neq 0 \rightarrow x\neq 1$ $\quad x+2\neq 0 \rightarrow x\neq -2$

$\dfrac{3x+6+x-1}{(x-1)(x+2)}=\dfrac{4x+5}{(x-1)(x+2)}\neq 0$ $\quad x\neq -\frac{5}{4}$ $\quad -\frac{5}{4}$ $\quad D_f=\mathbb{R}-\{-1,0,1,-2,-\frac{5}{4}\}$

②

الف) $f(x)=\sqrt{\left(\left(\frac{1}{3}\right)^x-9\right)\left(32-4^x\right)}$ $\quad \left(\left(\frac{1}{3}\right)^x-9\right)\left(32-4^x\right)\geq 0$

$\left(\frac{1}{3}\right)^x=3^{-x}=3^2$ $\quad$ ریشه $\quad x=-2$ $\quad 2^5=2^{2x}$ $\quad$ ریشه $\quad x=\frac{5}{2}$

-2	$\frac{5}{2}$
+ ∅	− ∅ +

$D_f=\mathbb{R}-(-2,\frac{5}{2})$

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ب) $\sqrt{x-1}+\sqrt{y+1}=3$ $\quad x-1\geq 0$ $\quad x\geq 1$ $\quad D_f=[1,+\infty)$

③

$f(x)=\dfrac{\log_4(x^2-x-2)}{\sqrt{x^2-1}+1}$ $\longrightarrow x^2-x-2>0$

$\sqrt{x^2-1}+1\neq 0 \rightarrow$ همواره برقرار $\quad (x+1)(x-2)>0$ $\quad -1 \quad 2$

-1	2
+ ∅	− ∅ +

$D_f=(-\infty,-1)\cup(2,+\infty)=\mathbb{R}-[-1,2]$

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$x-1\geq 0 \rightarrow x\geq 1$

s.a.m

$3-\underbrace{\sqrt{x-1}}_{\geq 0}=\underbrace{\sqrt{y+1}}_{+}$ $\longrightarrow x\leq 82$ — $D_f=[1,82]$

$-x^{۲}+ax+۳$

$\sqrt{۳+ax-x^{۲}} \to D=[-۲,\frac{۳}{۲}]$ $a+b=? =\frac{۳}{۲}-\frac{۱}{۲}=۱$ ۴

$-۲=\alpha$ ریشه β ریشه $=b$ $P=\frac{c}{a}=-۳$ $b\times -۲=-۳$ $b=\frac{۳}{۲}$

$S=\frac{۳}{۲}-۲=-\frac{۱}{۲}=\frac{-a}{-۱}=a \to a=-\frac{۱}{۲}$

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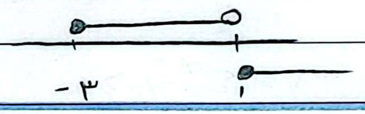
$f(x)=\begin{cases}۳x-۲ & ; x\geq ۱\\ ۲x+۳ & ; x<۱\end{cases}$ دامنه $g(x)=\sqrt{f(x)-x}$?

$f(x)-x\geq ۰$ $f(x)\geq x$

$x<۱ \to ۲x+۳\geq x$ $x\geq -۳ \xrightarrow{\cap} [-۳,۱)$

$x\geq ۱ \to ۳x-۲\geq x$ $۲x\geq ۲$ $x\geq ۱ \xrightarrow{\cap} [۱,+\infty)$



$D_f=[-۳,+\infty)$

۶

$ax+۲a+x+۲=(a+۱)x+۲a+۲$

$f(x)=\begin{cases}(a+۱)(x+۲) & ; x\geq ۱\\ ۳a+۲x & ; x<۱\end{cases}$

$\to ۳a+۲(-۲)=۳a-۴$

$۲f(۵)=f(-۲)+a$ $a=?$ $۷a+۷$

$۲(۵(a+۱)+۲a+۲)=۲(۵a+\cancel{۵+۲a+۲})=۱۴a+۱۴=۳a-۴+a$

$۱۴a+۱۴=۴a-۴$

$۱۰a=-۱۸$ $a=-۱/۸$

s.a.m

(۷)

$$f(x) = \sqrt{x} + \frac{1}{\sqrt{x}} + 2 \longrightarrow f(2-\sqrt{3}) + f(2+\sqrt{3}) = ?$$

$$\sqrt{2-\sqrt{3}} + \sqrt{2+\sqrt{3}} + 2 + \sqrt{2+\sqrt{3}} + \sqrt{2-\sqrt{3}}$$

☆ $2-\sqrt{3}$ و $2+\sqrt{3}$ معکوس اند $\nearrow$ $2(\underbrace{\sqrt{2-\sqrt{3}} + \sqrt{2+\sqrt{3}}}_{A}) + 4$

$$A^2 = 2-\cancel{\sqrt{3}} + 2 + \cancel{\sqrt{3}} + 2 = 6 \qquad A \longrightarrow A = \pm\sqrt{6}$$

جواب $= 2\sqrt{6} + 4$

(۸)

$$2f(x) - 3f(-x) = 4x^2 - x \xrightarrow{\times 2} \quad 4f(x) - \cancel{6f(-x)} = 8x^2 - 2x$$

$$2f(-x) - 3f(x) = 4x^2 + x \xrightarrow{\times 3 \oplus} \quad \cancel{6f(-x)} - 9f(x) = 12x^2 + 3x$$

$$f(x) = \frac{-12x^2 - 3x}{5} \qquad -5f(x) = \cancel{12x^2 + 3x}$$

$$f(x) = -4x^2 - \frac{1}{5}x \qquad 20x^2 + x$$

(۹)

$$(x+2)f(x) - 3xf(x+2) = 4x^2 - mx + 3m - 1 \qquad f(0) = ?$$

$$x = 0 \rightarrow 2f(0) = 3m - 1 \qquad f(0) = \frac{3m-1}{2} = \frac{25}{2} \times \frac{1}{2} = \frac{25}{4}$$

$$x = -2 \rightarrow 6f(0) = 16 + 2m + 3m - 1 = 5m + 15 \rightarrow 2f(0) = \frac{5}{3}m + 5$$

$$\frac{5}{3}m + 5 = 3m - 1 \qquad \frac{4}{3}m = 6 \qquad m = \frac{9}{2}$$

(۱۰) $f(x)$ تابع خطی

$$f(x) + f\left(\frac{1}{x}\right) = \frac{3x^2 - 12x + 3}{x} = \frac{ax^2 + 2bx + a}{x}$$

$$f(-1) = ?$$

$$f(x) = ax + b \qquad f\left(\frac{1}{x}\right) = \frac{a}{x} + b \qquad a = 3 \qquad b = -6$$

$$f(x) + f\left(\frac{1}{x}\right) = ax + b + \frac{a}{x} + b = \frac{ax^2 + bx + a + bx}{x} = \frac{ax^2 + 2bx + a}{x}$$

s.a.m $f(x) = 3x - 6$

$$f(-1) = -3 - 6 = -9$$