Subject: ماژیزی - تکلیف شماره ۲ Year: Month: Day :

(۱)

$y=\sqrt{nf(n)}$ ، $nf(n)\geq 0$

نقاط بحرانی: $n=0$، $n=2$، $n=-5$، $n=5$

$-5 \quad 0 \quad 2 \quad 5$

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

(۲)

$y=\sqrt{\frac{-n}{f(n)}}$ → $\frac{-n}{f(n)}\geq 0$ → $f(n)\neq 0$ → $D_f=(-2,0]\cup[0,2)=(-2,2)-\{0\}$

(۳)

$f(n)-2f(2)=n^2-3n+4$ ، $f(2)$ → $n=2$ → $f(2)-2f(2)=4-6+4$

$-f(2)=2$ → $f(2)=-2$ → $2f(2)=-4$

$f(n+4)=n^2-3n+4$

$n=-2$ → $f(-2+4)=4+6+4=14$ → $f(-1)=10$

(۴)

$f(n)=\begin{cases} n-\sqrt{n+2} & ;n>2 \\ 2n+2 & ;n\leq 2 \end{cases}$

$f(f(5))+f(f(1))$

$f(5)=5-\sqrt{7}=2$

$f(f(5))=f(2)=4+2=6$

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

$f(f(1))=f(5)=5-2=3$

$f(f(5))+f(f(1))=6+3=9$

(۵)

$f(n)=an^2-bn+2$ → $f(n-1)=a(n^2+1-2n)-b(n-1)+2=an^2+bn-2=2n+2$

$f(n-1)-f(n)=2n+2$ → $an^2+a-2an-bn+b+2-an^2+bn=2n+2$

$a+b-2an=2n+2$ → $a+b=2$ → $-2+b=2$ → $b=4$

$-2an=2n$ → $-2a=2$ → $a=-1$

$a-b=-1-4=-5$

(۶)

$f(n)=\frac{n^2+4n+5}{n^2+4n+7}$

$f(\sqrt{2}-2)=\frac{(\sqrt{2}-2)^2+4(\sqrt{2}-2)+5}{(\sqrt{2}-2)^2+4(\sqrt{2}-2)+7}=\frac{2+4-4\sqrt{2}+4\sqrt{2}-8+5}{2+4-4\sqrt{2}+4\sqrt{2}-8+7}=\frac{3}{3}=1$

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

$f(m) = m^2 + 2$

$f(-2) = ?$

$\rightarrow f(-2) = (-2)^2 + 2 = 4 + 2 = \boxed{11}$

$f(x) = \{(2,0)(1,-4)(0,2)(1,7)\} \rightarrow D_f = \{2,1,0,7\}$

$g(x) = \sqrt{9-x^2} \rightarrow (3-x)(3+x) \geq 0 \rightarrow D_g = [-3,3]$

$D_{\text{مشترک}} = \{2,1,0\}$

الف) $\frac{f}{g} = \{(0, \frac{2}{3})(1, \frac{-4}{\sqrt{5}})(2, \frac{0}{\sqrt{5}})\} = \{(0,\frac{2}{3})(1,-\sqrt{5})(2,0)\}$

ب) $\frac{g}{f} = \{(0,\frac{3}{2})(1,\frac{\sqrt{5}}{-4})(2,\frac{\sqrt{5}}{0})\} = \{(0,\frac{3}{2})(1,-\frac{\sqrt{5}}{4})\}$

$\frac{-\sqrt{5}}{4} = \frac{-\sqrt{5}\times 4}{4\times 4}$

$f(x) = \{(-2,1)(2,-5)(3,4)(1,2)\}$

الف) $f+1(x) = \{(-1,1)(2,-5)(3,5)(2,1)\}$ ب) $2f(x) = \{(-2,2)(2,-10)(3,8)(1,4)\}$

ج) $f^2(x)+1 = \{(-2,5)(2,25)(3,65)(1,17)\}$

د) $f(2x) = \{(1,1)(4,\frac{2}{5})(3,\frac{2}{5})(2,\frac{1}{5})\}$

$f(x) = \{(2,5)(1,3)(3,1)(2,8)\}$

$g(x) = \{(1,3)(4,-2)(3,-1)(1,2)(0,1)\}$

$D_{\text{مشترک}} = \{2,1,3\}$

$\frac{f}{g} = \{(2,\frac{5}{2})(1,\frac{3}{-1})(3,\frac{1}{-2})\}$

الف) $f-g = \{(2,3)(1,2)(3,2)\}$ ب) $\frac{f}{g} = \{(2,-3)(1,-3)(3,\frac{1}{2})\}$