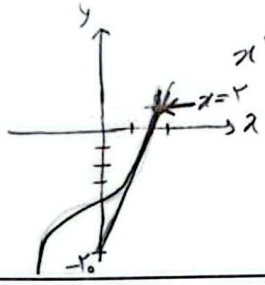
نام و نام خانوادگی .....سوتا بهمنی..... پاسخنامه تشریحی تکلیف شماره ...۱۱... کلاس ...یازدهم دختر B.....

۱

$f(x)=\begin{cases} x^2-4 & x\geq a \\ 12x-20 & x\leq a \end{cases}$

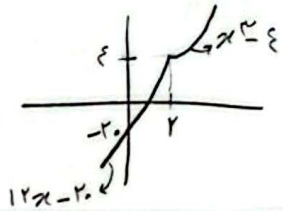



$x^2-4x=12x-20$

$x^2-12x+16=0$

$x=2$

$a=2 \rightarrow \begin{cases} x^2-4 ; x\geq 2 \\ 12x-20 ; x\leq 2 \end{cases} \rightarrow$




۲

الف) $f(7)=21-10=11$

ب) $f(f(x))=3(3x+10)-10=9x-4$

$f^{-1}(2)=4 \rightarrow f(4)=2 \rightarrow 12+k=2 \rightarrow k=-10$

۳

$A(2a,a) \rightarrow A'(a,2a)$

$2a=\frac{a^2}{a-1} \rightarrow 2a^2-2a=a^2$

$a^2-2a=0$

$a<0$ ✗

$a<+2$ ✓

۴

الف) $3\rightarrow 5\rightarrow x$, $4\rightarrow 7\rightarrow 2$, $7\rightarrow 2\rightarrow x$, $9\rightarrow 4\rightarrow x$ $\rightarrow fof^{-1}=\{(4,2)\}$

ب) $f^{-1}of(x)=\{(3,3)(4,4)(7,7)(9,9)\}$

ج) $fog^{-1}(x)=\{(2,0)(5,4)\}$

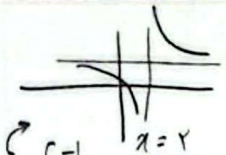
د) $g^{-1}of=\{(3,4)(7,3)(9,8)\}$

۵

$Df=\{2,4,9\}$ $Dg^{-1}=\{1,3,5\}$ $Dh=\{1,3,4,5\}$

$\frac{h(3)}{f(g^{-1}(3))}=\frac{4}{8}=\frac{1}{2}$

۶



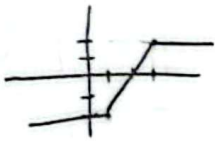

$yx - 2y = 2x + 1$

$x(y-2) = 1 + 2y$

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


متقارن نیستند ✓

۷

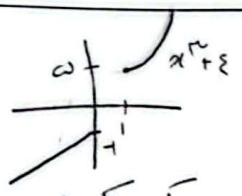


$\Rightarrow [a,b] = [1,2]$

$f(x) = 3 - x^2 \quad ; \quad 2 \geq x \geq 1$

$f^{-1}(x) = \frac{3-x}{2} \quad ; \quad 1 \geq x \geq 0$

۸




یک به یک ✓

$x = y^3 + 3 \rightarrow y = \sqrt[3]{x-3} = h \quad ; \quad 1 \leq x \leq 3$

$y = \frac{3}{1+x} = h \rightarrow 1+x = \frac{3}{h} \quad ; \quad 0 < x \leq 1$

$f^{-1}(x) = \begin{cases} \sqrt[3]{x-3} & ; \quad 3 \leq x \leq 3 \\ \frac{3}{1+x} & ; \quad 1 \geq x > 0 \end{cases}$

۹

$y = \frac{x^3 - 3x^2 + 2x - 1}{x^2 + 1} = \frac{x^3 - 2x - 1}{x^2 + 1} \rightarrow yx^2 + y = x^3 - 2x - 1$

$x(y^2 + 2) = y + 1$

$f^{-1}(x) = \frac{x+1}{x^2+2} = \frac{b-x}{ax+b}$

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

$f^{-1}(b) = 2$

۱۰

$x = \frac{y}{1+y^2} \rightarrow xy^2 + x = y \rightarrow xy^2 - y + x = 0 \rightarrow y = \frac{1 \pm \sqrt{1-4x^2}}{2x}$

$D_f \rightarrow R \quad , \quad R_g \rightarrow \frac{-1}{2} \leq y \leq \frac{1}{2}$

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