نوشتن تابع

$$f(x+2)\begin{cases} 3x+5 & x \geq 1 \\ 4x-1 & x < 1 \end{cases}$$

$$f(x)\begin{cases} 3(x-2)+5 = 3x-1 & x \geq 3 \\ 4(x-2)-1 = 4x-9 & x < 3 \end{cases}$$

$$f(3-x)\begin{cases} 3(3-x)-1 = 9-3x-1 = -3x+8 & x \leq 0 \\ 4(3-x)-9 = -4x+3 & x > 0 \end{cases}$$

$$f(x+1)\begin{cases} 3(x+1)-1 = 3x+2 & x \geq 2 \\ 4(x+1)-9 = 4x-5 & x < 2 \end{cases}$$

$f(3-x) - f(x+1)$:

- $x \leq 0$: $-3x+8-4x+5 = -7x+13 \geq 0 \rightarrow 7x \leq 13 \Rightarrow x \leq \frac{13}{7} \Rightarrow x = (-\infty, 0]$
- $0 < x < 2$: $-4x+3-4x+5 = -8x+8 \geq 0 \rightarrow 8x \leq 8 \Rightarrow x \leq 1 \Rightarrow (0, 1]$
- $x \geq 2$: $-4x+3-3x-2 = -7x+1 \geq 0 \rightarrow 7x \leq 1 \Rightarrow x \leq \frac{1}{7} \Rightarrow \emptyset$

$$D_y = (-\infty, 1]$$

$(-\infty,0) \Leftarrow x<0 \Leftarrow x^3<0 \Leftarrow$ -٢

$x^3 > (x^2+x)^3 \Leftarrow$

$x > x^2 + x$

$\Leftarrow$

$f(x^2) > f\circ f(x)$

$f(x^2) > f((x^2+x)^2)$

۶- الف) $(a^2-3)^x \to a^2-3>0 \quad a^2>3$

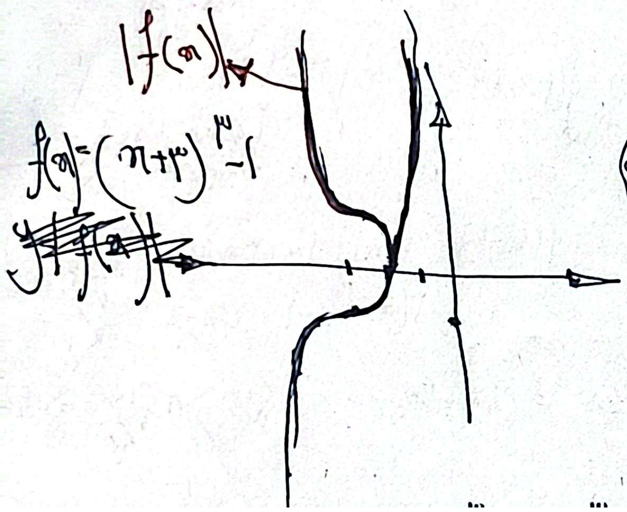
$\Rightarrow a>\sqrt{3}$

$a<-\sqrt{3}$

ب) $(a^2-3)^x \to a^2-3 \geq 0$

$\Rightarrow a \geq \sqrt{3}$

$a \leq -\sqrt{3}$



$(x+3)^3-1=0$

$\Rightarrow x=-2$

$x=0 \Rightarrow f(x)=26$

$\Rightarrow k=-2$

$(-2,+\infty)$

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$f(x) = \left(\sqrt{x} + 1/2\right)^2 - 9/4$

صعودی

$x_{max} = -b/2a = -1/2 < 0$

$x = 0 \rightarrow 1/4 - 9/4 = -8/4 = -2$

$y_{max} = -2$

$x \geq 0$

$\Rightarrow \sqrt{x} \geq x + \sqrt{x} - 2 \Rightarrow x - 2 \leq 0 \Rightarrow x \leq 2 \Rightarrow \{0, 1, 2\}$ [illegible]

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$$0 \leq \cos^2 x \leq 1 \rightarrow 2^{\sqrt[3]{9-1}} - 2^{\sqrt[3]{-8}} = 2^{2} - 2^{-2} = 4 - \frac{1}{4} = \frac{15}{4}$$

$$\rightarrow 2^{\sqrt[3]{-1}} - 2^{\sqrt[3]{1}} = \frac{1}{2} - 2 = \frac{1}{2} - \frac{4}{2} = -\frac{3}{2}$$

$$\Rightarrow [a,b] \quad \left[-\frac{3}{2}, \frac{15}{4}\right]$$

$$b-a = \frac{15}{4} + \frac{6}{4} = \frac{21}{4}$$

-۱۰

$x \in \mathbb{Z} \longrightarrow -۲$ $\qquad$ $x \in \mathbb{R}-\mathbb{Z} \longrightarrow (۰,۱)$

$f(x) = x-[x]-۲$

$g \circ f(x)$ $\quad x \in \mathbb{Z} \longrightarrow \dfrac{۲^{-۲}-۲^{۲}}{۲} = \dfrac{۱}{۸} - \dfrac{۳}{۲} = -\dfrac{۱۵}{۸}$

$\qquad x \in \mathbb{R}-\mathbb{Z} \longrightarrow \dfrac{۲^{۰}-۲^{۰}}{۲} = ۰$

$\qquad \dfrac{۲^{+۱}-۲^{-۱}}{۲} = ۲-\dfrac{۱}{۲}\Big/۲ = \dfrac{۳}{۴} \Rightarrow (۰,\dfrac{۳}{۴})$

$\Rightarrow R_{g\circ f} = (۰,\dfrac{۳}{۴}) \cup \{-\dfrac{۱۵}{۸}\}$