

استاذنا المحترم

19/5

$$12a - 20 \leq a^3 - 4 \rightarrow a^3 - 12a + 14 > 0 \rightarrow (a-2)^2(a+7) > 0$$

x	-4	2
P	$-$	$+$

$[-4, +\infty)$

$$f^{-1}(x) \Rightarrow x = 3y + k \rightarrow 3y = -k + x \rightarrow y = \frac{x - k}{3}$$

$$f^{-1}(1) = \frac{1 - k}{3} \quad 2 \leq \rightarrow \boxed{k = -10}$$

الف) $f(1) = 1 - 10 = -9$ ب) $f \circ f(x) = 3(3x - 10) - 10 = 4x - 40$

$$f^{-1}(x) \Rightarrow x = \frac{ay}{y-1} \rightarrow xy - x = ay \rightarrow y = \frac{x}{x-a} \xrightarrow{\frac{1}{a}}$$

$$\rightarrow a = \frac{1a}{1a-a} \rightarrow a = \frac{1a}{a} \rightarrow a^2 - 1a = 0 \quad a \begin{matrix} 1 \checkmark \\ 2 \times \end{matrix}$$

$$f^{-1} = \{(\omega, \psi)(\nu, \epsilon)(\nu, \nu)(4, 9)\} \quad g^{-1} = \{(\nu, \psi)(4, 1)(\omega, 9)\}$$

الف) $\omega \rightarrow \psi \rightarrow \omega$	ب) $\psi \rightarrow \omega \rightarrow \psi$	ج) $\nu \rightarrow \psi \rightarrow \omega$
$\nu \rightarrow \epsilon \rightarrow \nu$	$\epsilon \rightarrow \nu \rightarrow \epsilon$	$4 \rightarrow 1 \rightarrow 4$
$\nu \rightarrow \nu \rightarrow \nu$	$\nu \rightarrow \nu \rightarrow \nu$	$\omega \rightarrow 9 \rightarrow 4$
$4 \rightarrow 9 \rightarrow 4$	$9 \rightarrow 4 \rightarrow 9$	

$\{(\omega, \omega) (\nu, \nu) (\nu, \nu) (4, 4)\} \quad \{(\psi, \psi) (\epsilon, \epsilon) (\nu, \nu) (9, 9)\} \quad \{(\nu, \omega) (\omega, 4)\}$

د) $\psi \rightarrow \omega \rightarrow 9$ $\{(\nu, 9) (\nu, \psi) (9, 1)\}$

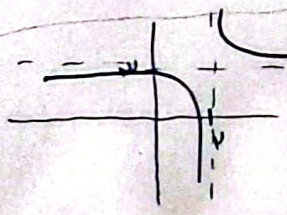
$\epsilon \rightarrow \nu \rightarrow 4$

$\nu \rightarrow \nu \rightarrow \psi$

$9 \rightarrow 4 \rightarrow 1$

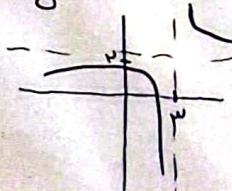
$$f \circ g^{-1} = \{(1, \epsilon) (\nu, 1) (\omega, \omega)\} \quad h = \{(1, \nu) (\psi, \epsilon) (\epsilon, 1) (\omega, 1)\}$$

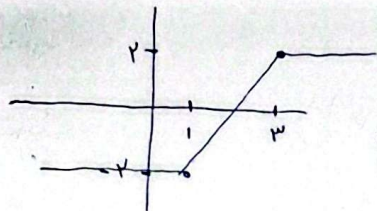
$$\frac{h}{f \circ g^{-1}} = \{(1, \frac{\nu}{\epsilon}) (\psi, \frac{\epsilon}{1})\} = \{(1, \frac{1}{\nu}) (\psi, \frac{1}{\nu})\}$$



$$f^{-1}(x) \Rightarrow x = \frac{3y+1}{y-2} \rightarrow y = \frac{2x+1}{x-3}$$

شكل تابع عكس





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

مشتق

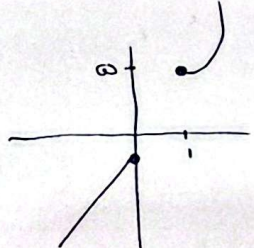
$$y = 2a + b$$

$$-y = a + b$$

$$a = 2 \quad b = -1$$

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

(v)



$$f^{-1}(x) = \begin{cases} \sqrt{x-1} & x \geq 1 \\ \frac{x+1}{2} & x < 1 \end{cases}$$

f(x) زوجة، f(x) فردية

(11)

(5)

(9)

(1, 1.5)

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

$$y = \frac{2x+1}{-x-1} \rightarrow \frac{-y-1}{2x+1} = \frac{a x + b}{c x + d}$$

$$a = -1, b = -1, c = 2, d = 1$$

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

$$\frac{1}{y} = 0$$

(10)

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

$$y = \frac{1 \pm \sqrt{1-4x^2}}{2x}$$

(5)

$$(I) 1-4x^2 \geq 0 \rightarrow 1 \geq 4x^2 \rightarrow \frac{1}{2} \geq x^2 \rightarrow [-\frac{1}{2}, \frac{1}{2}]$$

$$f^{-1}(x) = \begin{cases} \frac{1-\sqrt{1-4x^2}}{2x} & 0 < x \leq \frac{1}{2} \\ \frac{1+\sqrt{1-4x^2}}{2x} & -\frac{1}{2} \leq x < 0 \end{cases}$$