

$$n^3 - 2 = 12n - 20$$

$$n^3 - 12n + 14 = 0$$

$$(n-2)(n^2+2n-7) = 0$$

$$(n-2)(n+2)(n-2) \geq 0$$

$$\begin{array}{r} -2 \quad 2 \\ - \quad + \quad + \\ \hline 9(7-2) \end{array}$$

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$$\frac{r(x) + k}{12} = 2 \rightarrow f(x) = 12x - 10$$

الف) $f(7) = r(7) - 10 = 11$

ب) $f(f(n)) = r(12n - 10) - 10 = 9n - 20$

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

$$a^2 = 2a^2 - 10a$$

$$a^2 - 2a = 0 \rightarrow a(a-2) = 0$$

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و بر لب بر لب نشست

$a = 2$

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الف) $f \circ f = f^{-1} = \{(5, 3), (7, 4), (2, 1), (4, 9)\}$

$\omega \rightarrow 3 \rightarrow \omega \rightarrow (\omega, 3)$

$7 \rightarrow 4 \rightarrow 7 \rightarrow (7, 4)$

$2 \rightarrow 1 \rightarrow 2 \rightarrow (2, 1) \rightarrow 9, 9 \rightarrow 4 \rightarrow (4, 9)$

ب) $\{(2, 3), (4, 4), (7, 7), (9, 9)\}$

$g^{-1} = \{(2, 3), (4, 4), (7, 7), (9, 9)\}$

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ج) $\{(3, 9), (7, 3), (9, 1)\}$

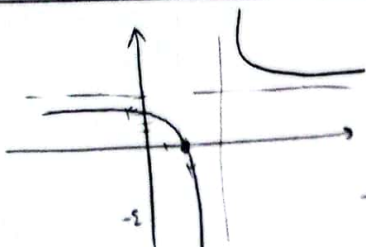
$$g^{-1}(n) = \{(1, 2), (3, 4), (5, 6)\}$$

$$f \circ g^{-1} = \{(1, 2), (3, 4), (5, 6)\}$$

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$h \circ f \circ g^{-1} = D_n \cap f \circ g = \{(1, 2), (3, 4)\}$

$\{(1, \frac{2}{2}), (3, \frac{4}{1}), (\omega, \omega)\}$



$$x = \frac{1}{y} + r$$

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

x	1
y	-r

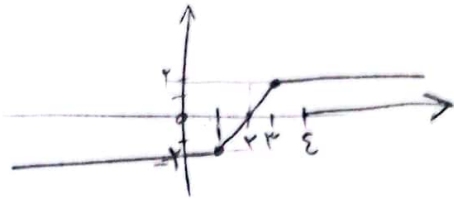
$$y x - r y = r x + 1$$

$$x = \frac{1 + r y}{y - r}, f^{-1}(y) = \frac{r y + 1}{y - r}$$

$$u = \frac{1}{y - r}, r = \frac{1}{u} - r$$

$$y = \frac{1}{\frac{1}{u} - r} = r$$

x	0	1	r	ε
y	-r	-r	r	r



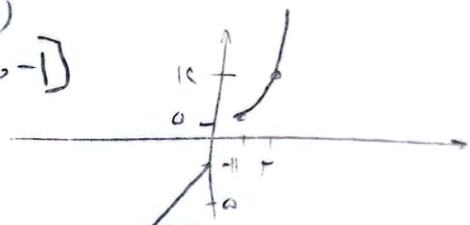
$$f^{-1}(y) = r x - \epsilon$$

$$r y - \epsilon = x$$

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

$$[a, b] \xrightarrow{f^{-1}} [1, r]$$

$$f(x) = \begin{cases} x + \epsilon : x > 1 & R_1 = [0, \infty) \\ \epsilon x - 1 : x \leq 0 & R_2 = (-\infty, -1] \end{cases}$$



$$x + \epsilon = y$$

$$x = \sqrt[y]{y - \epsilon} \Rightarrow f^{-1}(y) = \sqrt[y]{y - \epsilon}$$

$$\epsilon x - 1 = y$$

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

$$f^{-1}(y) = \begin{cases} \sqrt[y]{y - \epsilon} & y > 0 \\ \frac{y + 1}{\epsilon} & y < -1 \end{cases}$$

$$y = \frac{-1 - r x}{x + r}$$

$$y x + r y = -1 - r x$$

$$x = \frac{-1 - r y}{y + r}$$

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

$$f^{-1}(b) = \frac{-(-r - 1) - 1}{-r + \epsilon} = \frac{r}{-r + \epsilon}$$

$$\frac{-y x - 1}{r x + 1} = \begin{cases} a = -4 \\ b = -r \\ d = y \end{cases}$$

$$[-1, 1] \xrightarrow{f^{-1}} f^{-1}(x) \text{ (not)}$$

$$[-\frac{1}{r}, \frac{1}{r}] \xrightarrow{f^{-1}} f^{-1}(x) \text{ (not)}$$

$$\begin{cases} y x^r - x + y = 0 \\ \Delta = 1 - 4 y^r \end{cases}$$

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

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

نقطة التقاطع بين المنحنى والخط المستقيم

$$x \in [\frac{1}{r}, \frac{1}{r}]$$

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