SUBJECT:

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حسن باقری — تکلیف شماره ۱۰ — یازدهم دبیرستان

الف) $n^2 - n = 2 \rightarrow n^2 - n - 2 = 0 \rightarrow (n-2)(n+1) = 0 \rightarrow n = 2$ ①

$\boxed{m = 2}$

$n = -1$ غ ق ق

ب) $m = 2 \rightarrow m - 1 = 2 - 1 = 1 \quad (a, 1) \rightarrow (-1, 1)$

$\xrightarrow{a=-1} a + 2 \rightarrow -1 + 2 = 1 \quad (1, n) \rightarrow (1, 2) \rightarrow \boxed{n = 2}$

$x = 1 \rightarrow x + a < 2$ ②

$1 + a < 2$

$\boxed{a < 1}$

$a > 0$ (I) $\quad [2, +\infty) \leftarrow 3x - 1$ بُرد ③

$a - 1 < 1 \rightarrow a < 2$ (II)

(I) $\cap$ (II) $= \boxed{0 < a < 2}$

الف) $y = x^3 + 2 \quad y_1 = y_2 \rightarrow x_1 = x_2$ ④

$x_1^3 + 2 = x_2^3 + 2$

$x_1 = x_2 \rightarrow x^3 = y - 2 \rightarrow x = \sqrt[3]{y-2}$

$\boxed{f^{-1}(x) = \sqrt[3]{x-2}}$ یک به یک است

(4) ب) $y = x^2 - 4x + 2$ $\qquad y_1 = y_2 \to x_1 = x_2$

$x_1^2 - 4x_1 + 2 = x_2^2 - 4x_2 + 2$

$x_1 = \pm x_2$ یک به یک نیست

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(5) الف) $y = \frac{3x+1}{x-2}$ هموگرافیک است ← یک به یک است

$yx - 2y = 3x + 1 \to x(y-3) = 2y + 1 \to x = \frac{2y+1}{y-3}$

$\to y = \frac{2x+1}{x-3}$ $\qquad \boxed{f^{-1}_{(x)} = \frac{2x+1}{y-3}}$

ب) $y = \frac{4+2x}{x+2}$ $\qquad \frac{ax+b}{cx+d} \to ad = bc$

$2 \times 2 = 4 \times 1$

هموگرافیک نیست ← یک به یک نیست

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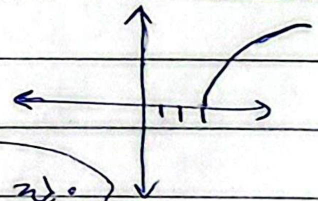
(6) الف) $y = \sqrt{x-3} \to x = \sqrt{y-3}$



$x^2 = y - 3 \to y = x^2 + 3 \ \ x \geq 0 \to \boxed{f^{-1}_{(x)} = x^2 + 3 \ \ x \geq 0}$

ب) $y = x^2 - 4x + 3$ $\qquad x \in [2, +\infty)$

$y = (x-2)^2 - 1 \to x - 2 = \pm\sqrt{y+1} \to x = \pm\sqrt{y+1} + 2$

$\boxed{f^{-1}_{(x)} = 2 + \sqrt{x+1}}$

غ ق ق چون دامنه $x \geq 2$
و برد معکوس برابر دامنه.

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(۷) $y = x + \sqrt{x} \rightarrow \left(\sqrt{x} + \frac{1}{2}\right)^2 - \frac{1}{4}$

$x = \left(\sqrt{y} + \frac{1}{2}\right)^2 - \frac{1}{4} \rightarrow x + \frac{1}{4} = \left(\sqrt{y} + \frac{1}{2}\right)^2$

$\rightarrow \sqrt{y} = \sqrt{x + \frac{1}{4}} - \frac{1}{2}$

$\xrightarrow{\text{توان ۲}} y = x + \frac{1}{4} + \frac{1}{4} - \sqrt{x + \frac{1}{4}}$

$\rightarrow f_{(x)}^{-1} = x + \frac{1}{2} - \sqrt{x + \frac{1}{4}}$ $\quad 1 + 2\left(\frac{1}{2}\right) + 4\left(\frac{-1}{4}\right) = 1$

$a = 1 \quad b = \frac{1}{2} \quad c = \frac{-1}{4}$

(۸) $f(x_1) = f(x_2) \rightarrow \frac{x_1}{\sqrt{x_1^2 - 2}} = \frac{x_2}{\sqrt{x_2^2 - 2}}$

$\xrightarrow{\text{توان ۲}} \frac{x_1^2}{x_1^2 - 2} = \frac{x_2^2}{x_2^2 - 2} \rightarrow x_1^2 x_2^2 - 2x_1^2 = x_1^2 x_2^2 - 2x_2^2$

$\rightarrow x_1^2 = x_2^2 \rightarrow x_1 = \pm x_2 \xrightarrow{\text{غ ق ق}} x_1 = x_2$

$y = \frac{x}{\sqrt{x^2 - 2}} \Rightarrow x = \frac{y}{\sqrt{y^2 - 2}} \rightarrow x^2 = \frac{y^2}{y^2 - 2}$

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

$\rightarrow y = \pm \sqrt{\frac{2x^2}{x^2 - 1}} \xrightarrow{\text{غ ق ق}} y = \frac{\sqrt{2}x}{\sqrt{x^2 - 1}}$

Senobar

$D_{f(g)^{-1}} = R(g) = \frac{-2}{5}$ (9)

$\sqrt{x} - 1 = \frac{-2}{5} \rightarrow \sqrt{x} = \frac{3}{5} \rightarrow x = \frac{9}{25}$

$\frac{-2}{5} = f \text{ ابتدا} \rightarrow f_{(x)}^{-1}$

$\frac{x}{1+|x|} = \frac{-2}{5} \Longrightarrow 5x = -2 - 2|x|$

$\rightarrow 5x = -2 + 2x \rightarrow x = \frac{-2}{3}$

$\frac{-2}{3} + \frac{9}{5} = \boxed{\frac{-25}{15}}$

$y = \sqrt[3]{x-1} \rightarrow x = \sqrt[3]{y-1} \rightarrow x^3 = y - 1$ (10)

$\rightarrow x^3 + 1 = y \qquad f(x) = x^3 + 1$

$g(x) = f(x) + \sqrt{f(x)} = 12$

$f(x) = 9 \qquad x^3 + 1 = 9 \rightarrow x^3 = 8 \rightarrow \boxed{x = 2}$