

پہا احسنی

$$n^2 - n = 2 \rightarrow n^2 - n - 2 = 0 \rightarrow n = -1 \times \text{عق} \rightarrow (-1, 2), (-1, 2) \rightarrow n = 2 \checkmark$$

$$\{(\cancel{3}, \cancel{2}), (2, 2), (3, 2), (m, 2), (-1, 2)\} \rightarrow m = 3$$

$$\rightarrow m = 2, a = -1, n = 2$$

$$\{(\cancel{-1}, \cancel{1}), (\cancel{1}, \cancel{2}), (\cancel{2}, \cancel{3}), (-1, 1), (1, 2), (2, 3)\}$$

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$$f(n) \begin{cases} m_{n-1} ; n \geq 1 \\ n+a ; n < 1 \end{cases}$$

$$m_{n-1} \xrightarrow{\text{نستری مقدار}} m(1) - 1 = 2$$

$$n+a < 2 \rightarrow 1+a < 2 \rightarrow a < 1$$

$$\left. \begin{matrix} n+1 \\ m_{n-1} \end{matrix} \right\} \xrightarrow{h=1} \begin{matrix} 1+1=2 \text{ قفای} \\ m(1) - 1 = 2 \end{matrix} \leftarrow a \text{ نیز پانچ سی دسزیا}$$

$$a \in (-\infty, 1]$$

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$$an + a - 1 = m' - 1 \rightarrow an + a = m' \rightarrow a(n+1) = m' \rightarrow$$

$$n+1 = \frac{m'}{a} \rightarrow n = \frac{m' - a}{a} \rightarrow a \neq 0$$

$$\text{طبق شرط} \rightarrow \frac{m' - a}{a} \leq 0$$

$$a \rightarrow \text{مثبت} \rightarrow m' - a \leq 0 \rightarrow a \geq m' \times$$

$$a \rightarrow \text{منفی} \rightarrow m' - a \geq 0 \rightarrow m' \geq a \times$$

$$0 \leq a < 2 \leftarrow \text{اجتناب} \begin{cases} a \rightarrow \text{صفر} \rightarrow f(n) = -1 \rightarrow a \neq 0 \checkmark \\ 0 < a < 2 \rightarrow m' - a > 0 \rightarrow m' > a \checkmark \end{cases}$$

برای معنی

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$$\text{الف) } y = x^3 + 2 \rightarrow y_1 = y_2 \rightarrow x_1 = x_2 \rightarrow x_1^3 + 2 = x_2^3 + 2 \rightarrow$$

$$x_1^3 = x_2^3 \rightarrow x_1 = x_2 \checkmark \text{ یک به یک است}$$

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

$$\text{ب) } y = x^2 - 5x + 2$$

$$y_1 = y_2 \rightarrow x_1 = x_2 \rightarrow x_1^2 - 5x_1 + 2 = x_2^2 - 5x_2 + 2 \rightarrow$$

$$x_1^2 - 5x_1 = x_2^2 - 5x_2 \rightarrow x_1(x_1 - 5) = x_2(x_2 - 5) \checkmark$$

یک به یک نیست

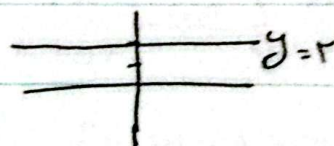
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$$\text{الف) } y = \frac{3x+1}{x-2} \rightarrow \text{یک به یک است، همگرا نیست}$$

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

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

$$\text{ب) } y = \frac{2x+2}{x+2} = 2 \rightarrow \text{یک به یک نمی باشد}$$



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$$\text{الف) } y = \sqrt{x-3} \rightarrow y_1 = y_2 \rightarrow x_1 = x_2 \rightarrow \sqrt{x_1-3} = \sqrt{x_2-3}$$

$$\text{ب) } x_1^2 = x_2^2 \rightarrow x_1 = x_2 \text{ است یک به یک}$$

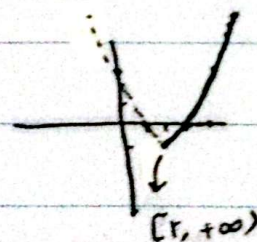
$$f^{-1}(x) \Rightarrow x = \sqrt{y-3} \rightarrow x^2 = y-3 \rightarrow y = x^2 + 3$$

$$\text{ب) } y = x^2 - 5x + 3 \text{ یک به یک است}$$

$$f^{-1}(x) \Rightarrow y = x^2 - 5x + 3 + 1 \rightarrow y = (x-2)^2 - 1$$

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

$$y = 2 + \sqrt{x+1} \rightarrow R_y \geq 2 \text{ متناهی می باشد}$$



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مربا ایسی

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$$f(x) = x + \sqrt{x} \in (0, +\infty)$$

$$f^{-1}(x) = ax + b\sqrt{x-c}$$

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

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

$$f^{-1}(x) = ax + b\sqrt{x-c}$$

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

$$a + 4b + 4c = 1$$

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

$$x^2 - 2 \geq 0 \rightarrow x^2 \geq 2 \rightarrow x \geq \sqrt{2} \cup x \leq -\sqrt{2}$$

$$D = (-\infty, -\sqrt{2}] \cup [\sqrt{2}, +\infty) \rightarrow (-\infty, -\sqrt{2}) \cup (\sqrt{2}, +\infty)$$

ریشه خارج

$$\left. \begin{array}{l} x > \sqrt{2} \\ x < -\sqrt{2} \end{array} \right\} \text{ دو به دو } b^-$$

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

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

نوع المسألة

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$$f^{-1}(u) = \frac{u}{1+|u|} \rightarrow f(u) = \frac{y}{1+|y|}$$

$$g(u) = \sqrt{u} - 1 \rightarrow g^{-1}(u) \Rightarrow u = \sqrt{y} - 1 \rightarrow u + 1 = \sqrt{y} \rightarrow$$

$$u^2 + 1 + 2u = y \rightarrow g^{-1}\left(-\frac{r}{a}\right) = \frac{\sqrt{y}}{\sqrt{a}} - \frac{r}{a} = \frac{\sqrt{y}}{\sqrt{a}} - \frac{\sqrt{y}}{\sqrt{a}} = \frac{y}{\sqrt{a}}$$

$u \geq 0$:

$$y = \frac{u}{1+u} \rightarrow y(1+u) = u \rightarrow y + yu = u \rightarrow y = u - yu \rightarrow$$

$$y = u(1-y) \rightarrow u = \frac{y}{1-y}$$

$u < 0$:

$$y = \frac{u}{1-u} \rightarrow y(1-u) = u \rightarrow y - yu = u \rightarrow y = u + yu \rightarrow$$

$$y = u(1+y) \rightarrow u = \frac{y}{1+y}$$

$$f(u) = \begin{cases} \frac{u}{1-u} & ; u \geq 0 \\ \frac{u}{1+u} & ; u < 0 \end{cases}$$

$$f\left(-\frac{r}{a}\right) = \frac{-\frac{r}{a}}{1 - \frac{r}{a}} = -\frac{r}{r}$$

$$\frac{y}{\sqrt{a}} - \frac{r}{r} = \frac{\sqrt{y} - \frac{r}{a}}{\sqrt{a}} = -\frac{r}{\sqrt{a}}$$

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مراجعة

- 1.

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

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

$$x^3 = y-1 \rightarrow y = x^3+1$$

$$g(x) = f(x) + \sqrt{f(x)} = (x^3+1) + \sqrt{x^3+1}$$

$$g^{-1}(x) \Rightarrow \underbrace{y^3+1}_t + \sqrt{y^3+1} = \frac{24}{12} \rightarrow t + \sqrt{t} = 12 \rightarrow t = 9$$

$$9 = y^3+1 \rightarrow y = 2$$