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طرحه یوحنا عیسیٰ - تالیف ۱۵

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$$\{(r, r), (n, a), (r, n^r - n), (m, r), (-1, \varepsilon)\}$$

$$n^r - n = r \rightarrow n^r - n - r = 0 \rightarrow n = 1 \rightarrow (-1, \varepsilon) \text{ بطلد}$$

$$m = r \rightarrow n = r \rightarrow \text{ق}$$

$$\{(-1, 1), (1, r), (r, r), (a, m-1), (a+r, n), (m, r)\}$$

$$(r, r), (m, r) \rightarrow m = r$$

$$\text{if } m = r \rightarrow (-1, 1), (a, 1) \rightarrow a = -1$$

$$a+r = -1+r = 1 \rightarrow (1, r), (1, n) \rightarrow n = r$$

$$\downarrow$$

$$a+r$$

$$10 \quad f(x) = \begin{cases} rx-1 & x \geq 1 \\ x+a & x < 1 \end{cases}$$

$$rx-1 \geq 1 \rightarrow [r, +\infty)$$

$$x+a < 1 \rightarrow (-\infty, a+1)$$

$$[r, +\infty) \cap (-\infty, a+1) = \emptyset$$

$$a+1 \leq r \rightarrow a \leq r-1$$

$$15 \quad f(x) = \begin{cases} rx-1 & x \geq 1 \\ ax+a-1 & x \leq 0 \end{cases}$$

$$I \quad a \neq 0 \Rightarrow$$

$$rx-1 \geq 1 \rightarrow [r, +\infty) \quad II$$

$$ax+a-1 \leq 0 \rightarrow (-\infty, a-1] \rightarrow a \geq 0 \quad III$$

$$I \cap II \cap III = (0, r)$$

$$20 \quad y = x^r + r \rightarrow x^r = y - r \rightarrow x = \sqrt[r]{y-r}$$

$$\hookrightarrow x_1^r + r = x_2^r + r \rightarrow x_1 = x_2$$

$$y = x^r - rx + r \rightarrow$$

$$25 \quad y = \frac{rx+1}{x-r} \rightarrow$$

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

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

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$$y = \sqrt{x-r} \rightarrow x-r = y^2 \rightarrow x = y^2 + r$$

$$y = x^2 + r \quad x \geq 0$$

$$y = x^2 - rx + r, x \in [r, +\infty)$$

$$y = x^2 - rx + r - 1$$

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

$$y = \pm \sqrt{x+1} + r \quad [-1, +\infty)$$

$$y = x + \sqrt{x} \rightarrow y_1 = y_2 \rightarrow x_1 + \sqrt{x_1} = x_2 + \sqrt{x_2} \rightarrow (x_2 - x_1) + (\sqrt{x_2} - \sqrt{x_1}) = 0$$

$$(\sqrt{x_2} - \sqrt{x_1})(\sqrt{x_2} + \sqrt{x_1} + 1) = 0$$

$$\sqrt{x_2} - \sqrt{x_1} = 0 \rightarrow \sqrt{x_2} = \sqrt{x_1}$$

$$x_1 = x_2$$

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

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

$$\begin{cases} ax + b - \sqrt{x + \frac{1}{x}} \\ x + \frac{1}{x} - \sqrt{x - c} \end{cases} \rightarrow a=1$$

$$c = -\frac{1}{x} \rightarrow a + rb + rc = 1$$

$$b = \frac{1}{x}$$

$$y = \frac{x}{\sqrt{x^2 - r}} \rightarrow y_1 = y_2 \Rightarrow \frac{x_1}{\sqrt{x_1^2 - r}} = \frac{x_2}{\sqrt{x_2^2 - r}} \rightarrow \frac{x_1^2}{x_1^2 - r} = \frac{x_2^2}{x_2^2 - r}$$

$$x_1^2 = x_2^2 \rightarrow x_1 = \pm x_2$$

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

$$g(x) = \sqrt{x-1} \rightarrow y(\sqrt{x-1}) = x \rightarrow \sqrt{x-1} = \frac{x}{y} \rightarrow \sqrt{x} = \frac{x}{y} \rightarrow x = \frac{y^2}{y^2 - 1}$$

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

$$\frac{x}{1+|x|} \rightarrow f(x) \rightarrow f\left(\frac{x}{1+|x|}\right) = x$$

$$\frac{x}{1+|x|} = \frac{-r}{a} \rightarrow rx = -r$$

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

$$\frac{a}{r} - \frac{r}{r} = \frac{r^2 - a}{ra} = \frac{-r^2}{ra}$$

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$$g(x) = f(x) + \sqrt{f(x)} \rightarrow g^{-1}(\sqrt{f(x)} + f(x)) = x \quad I$$

$$f^{-1}(x) = \sqrt{x-1} \rightarrow f(\sqrt{x-1}) = x$$

$$\left. \begin{array}{l} t^r = x-1 \\ x = t^r + 1 \end{array} \right\} f(x) = x^r + 1$$

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$$g^{-1}(\sqrt{x^r+1} + x^r, 1) = g^{-1}(1, r) \rightarrow \sqrt{x^r+1} + x^r + 1 = 1, r$$

$$t^r, t = 1, r \rightarrow t^r + t - 1, r = 0 \rightarrow (t + \varepsilon)(t - r) = 0$$

$$t = -\varepsilon \rightarrow \sqrt{x^r+1} = -\varepsilon \quad \text{و } \varepsilon$$

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$$t = r \rightarrow \sqrt{x^r+1} = r \quad \text{و } \varepsilon$$

$$x^r = \wedge$$

$$x = r \Rightarrow g^{-1}(r, r) = r$$

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