

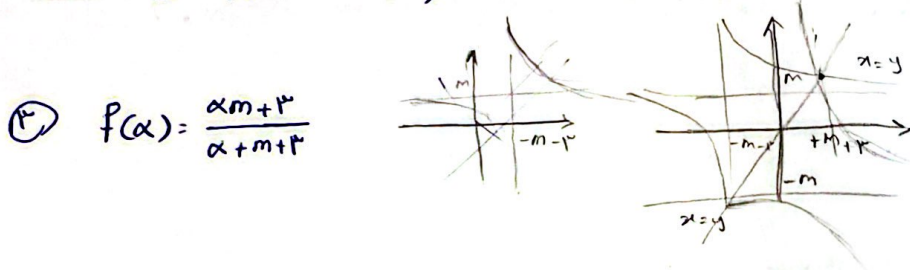
① $f(n) = n + [n] \rightarrow x = y + [y] \rightarrow [n] = 2[y] \rightarrow \frac{[n]}{2} = [y] \rightarrow x = y + \frac{[n]}{2} \rightarrow f^{-1}(x) = x - \frac{[n]}{2}$ (ارزش نسبی)

الف) $x + [n] = x - \frac{[n]}{2} \rightarrow \frac{[n]}{2} = 0 \rightarrow [n] = 0 \rightarrow 0 \leq n < 1 \rightarrow$ بسیار نادر

ب) $f \circ f(n) = 2n - \frac{[n]}{2} \rightarrow x = 2n - \frac{[n]}{2} \rightarrow n = \frac{[n]}{2} \rightarrow f^{-1}(\frac{[n]}{2}) = \frac{[n]}{2} - \frac{1}{2} = 0 \rightarrow f(1) = 2 \rightarrow$ عدد صحیح
 $\rightarrow f \circ f^{-1}(\frac{[n]}{2}) = 2 \rightarrow 2(\frac{[n]}{2}) - \frac{[n]}{2} = \frac{[n]}{2} \rightarrow$ عدد صحیح

② $y = \frac{ax+r}{tn+b} \rightarrow x = \frac{-b}{r} \rightarrow x = y \rightarrow \frac{-b}{r} = \frac{a}{r} \rightarrow -b = a \rightarrow y = \frac{an+r}{tn-a}$

$0 = b, a \in \mathbb{R} \rightarrow f(n) = f^{-1}(n) \rightarrow f \circ f(\Delta - \sqrt{y}) = f \circ f^{-1}(\Delta - \sqrt{y}) = \Delta - \sqrt{y}$



$\frac{mx+r}{\alpha+m+r} = n \rightarrow n^2 + \alpha n + rn = mn + r \rightarrow n^2 + rn - r = 0 \rightarrow \frac{1}{\alpha} + \frac{1}{\beta} = \frac{\alpha+\beta}{\alpha\beta} = \frac{-r}{-r} = 1$

④ $f(n) = |rn+d| - |dn+r|$

$\rightarrow f(n) = -rn + v$ $x \geq \frac{r}{a} \rightarrow f^{-1}(n) = \frac{v-n}{r}$ $x \leq \frac{r}{a} \rightarrow f^{-1}(n) = \frac{v-n}{r}$ $\frac{r}{a} = \frac{v}{r}$

⑤ $g(n) = rf(rn) - 1 \rightarrow g^{-1}(x) = af^{-1}(\frac{x+b}{c}) + d$

$x = g(af^{-1}(\frac{n+b}{c}) + d) \rightarrow x = rf(raf^{-1}(\frac{n+b}{c}) + rd)$

$f(rn) = \frac{g(n)+1}{r} \rightarrow rn = f^{-1}(\frac{g(n)+1}{r}) \rightarrow n = \frac{1}{r} f^{-1}(\frac{g(n)+1}{r})$

$g^{-1}(n) = af^{-1}(\frac{n+b}{c}) + d \rightarrow$

$$\textcircled{4} \quad f(n) = (\sqrt{n+1})^2 - 1 \quad x \geq 0 \quad y \geq 0 \quad (0,0)$$

$$\pm \sqrt{x+1} - 1 = \sqrt{y} \rightarrow (\pm \sqrt{x+1} - 1)^2 = y \rightarrow (\sqrt{x+1} - 1)^2 = y \quad x \geq 0$$

$$\textcircled{5} \quad y = \frac{x-1+y}{\sqrt{x+1}} \rightarrow x-1+y = \sqrt{x+1} \quad y^2 = 1 \rightarrow x=0$$

$$\textcircled{6} \quad f^{-1}(n) \geq n \quad \frac{f(n)}{f(n)} \rightarrow n \geq f(n) \rightarrow x \geq x^2 + 3x \quad 0 \geq x^2 + 3x$$

$$x(x+3) \leq 0$$

(حل صفر و ثلث)

نتیجه در صحنه اشتراک در نقاط صفر و ثلث است. $\left[\frac{0}{-3+} \right]$

$$\textcircled{7} \quad f(n) = -x + \sqrt{x+3} \quad x \geq -3 \quad y \leq 3$$

$$\textcircled{8} \quad x = -y + \sqrt{y+3} \rightarrow \textcircled{9} \quad x+3 = -y + \sqrt{y+3}$$

$$x+3+y-\sqrt{y+3} = x-3-y \rightarrow \cancel{x+3+y} + 1 + 2y - \sqrt{y+3} - 1 = 0$$

$$2(1+y) - \sqrt{y+3} - 1 = 0 \rightarrow 2+2y - t - 1 = 0 \quad \begin{matrix} t=1 \\ t=\frac{1}{2} \end{matrix} \quad t = -\frac{1}{4} \text{ رد}$$

$$\sqrt{y+3} = 1 \rightarrow y = -3 \quad x+t = 3+1 \quad \boxed{\begin{matrix} x=0 \\ y=-3 \end{matrix}} \quad \text{نقطه 1}$$

$$\textcircled{10} \quad \sqrt{x} + \sqrt{y} = 2 \xrightarrow{\text{مربع و ساده سازی}} \sqrt{y} + \sqrt{x} = 2 \xrightarrow{\text{مربع و ساده سازی}} x \geq 0 \quad y \geq 0 \quad x \geq y \geq 0$$

