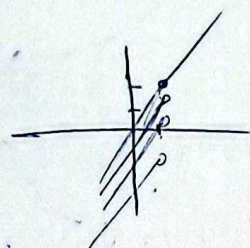


الف) $f = \{(r, u) (r, v) (r, n^r - n) (m, r) (-1, r)\}$

$n^r - n - r = 0$
 $(n-r)(n+1) = 0 \Rightarrow \boxed{n=r} \rightarrow (r, r) \quad (r, r)(m, r) \rightarrow \boxed{m=r}$
 $n = -1 \rightarrow (-1, 0) (-1, r) \times$

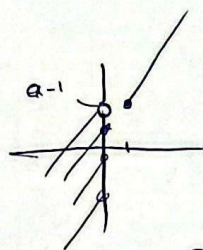
ب) $f = \{(-1, 1) (1, r) (r, r) (a, m-1) (a+r, n) (m, r)\}$
 $\boxed{a=-1} \quad \boxed{m=r} \quad \rightarrow (1, r) (1, r) \quad \boxed{n=r}$
 $\begin{matrix} (a, 1) & (a+r, n) \\ (-1, 1) & (1, r) \end{matrix}$

$f(n) = \begin{cases} r_{n-1} & n \geq 1 \rightarrow f(1) = r \\ n+a & n < 1 \\ f(1) = a+1 \end{cases}$



$a+1 \leq r$
 $\boxed{a \leq 1}$

$f(n) = \begin{cases} r_{n-1} & n \geq 1 \rightarrow f(1) = r \\ a_{n-1} + a - 1 & n \leq 0 \\ f(0) = a - 1 \end{cases}$



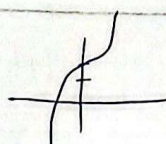
(1) $a > r$

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

(1) $a > r$

(2) $a \in (0, r)$

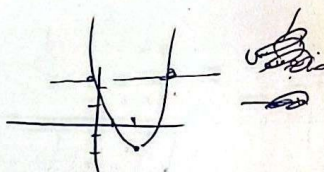
الف) $y = x^r + r$



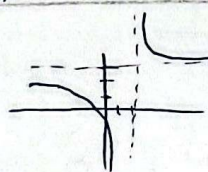
ضابطه مستوی

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

ب) $y = x^r - rx + r \rightarrow \text{X}$
 $-\frac{b}{a} = \frac{r}{r} = 1$



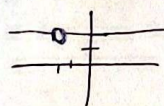
الف) $y = \frac{r_{n+1}}{n-r}$



ضابطه مستوی

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

ب) $y = \frac{r_{n+1}}{n+r} = \frac{r(n+r)}{(n+r)} \Rightarrow y = r$



الف) $y = \sqrt{x-3}$ ✓

ضابطه معکوس $x = \sqrt{y-3}$ $\xrightarrow{()^2}$ $x^2 = y-3$
 $R(f) = [0, +\infty)$ $\xrightarrow{()^2}$ $D(f^{-1}) = [3, +\infty)$
 $y = x^2 + 3$

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

ضابطه معکوس $x = y^2 - 4y + 3 + 1 - 1$
 $x = (y-2)^2 - 1 \rightarrow \sqrt{x+1} + 2 = y$
 $R(f) = [-1, +\infty)$

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

$x \in (0, +\infty)$

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

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

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

ضابطه معکوس $f^{-1}(x) \Rightarrow x = (\sqrt{y} + \frac{1}{2})^2 - \frac{1}{2}$
 $(\sqrt{x + \frac{1}{2}} - \frac{1}{2})^2 = y$

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

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

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

$\Rightarrow a+2b+c = 1+1-1 = 1$

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

تعریف معکوس

$(x_1, y) \Rightarrow x_1 = x_2$

$y_1 = y_2$

$\frac{x_1}{\sqrt{x_1^2-2}} = \frac{x_2}{\sqrt{x_2^2-2}} \xrightarrow{()^2}$ $\frac{x_1^2}{x_1^2-2} = \frac{x_2^2}{x_2^2-2}$

ضابطه معکوس

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

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

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

تابع معکوس

و گویان نمی توانیم دوبار برگردانیم به جهت آنکه چون علامت ی با علامت x هم علامت است (مخرج خارج صواب است)

$x_1 = x_2$ یعنی $y_1 = y_2$

$\Rightarrow x_1 = x_2$

$f^{-1}(x) = \frac{x}{|x|+1} \rightarrow f^{-1}(\frac{-2}{3}) = ? \rightarrow f^{-1}(?) = \frac{-2}{3} \rightarrow \frac{x}{|x|+1} = \frac{-2}{3} \rightarrow -2|x| - 2 = 3x$
 $-2|x| = 3x + 2$

$g(x) = \sqrt{x} - 1 \rightarrow g^{-1}(\frac{-2}{3}) = ? \rightarrow g(?) = \frac{-2}{3}$

$\sqrt{x} - 1 = \frac{-2}{3}$

$\frac{9}{25} - \frac{2}{5} = \frac{25-10}{25} = \frac{15}{25} = \frac{3}{5}$

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

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

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

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

$g^{-1}(12) = ? \rightarrow g(?) = 12$

$x^3 + 1 + \sqrt{x^3 + 1} = 12$
 $x = 2$

چون