

$|x-a| = -a - r \in [0, a]$

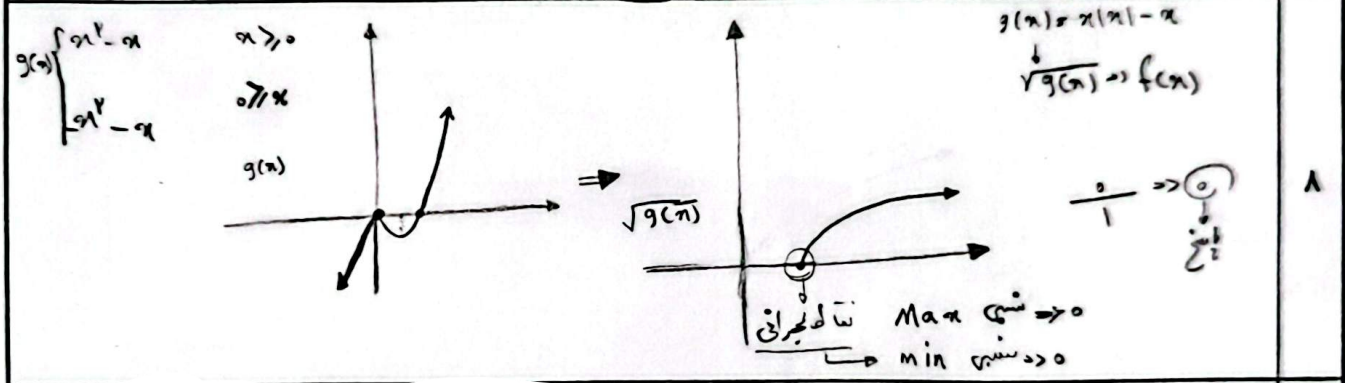
$T(x) = \sqrt{nr(a-x)} \Rightarrow f'(x) = \frac{r}{\sqrt{nr}}(a-x) - \sqrt{nr}$

$f'(x) = \frac{ra - rx - nr}{\sqrt{nr}} = 0 \Rightarrow ra - rx - nr = 0 \Rightarrow x = \frac{ra}{r} = a$

$f(a) = f(a) = \dots$

$f(\frac{ra}{a}) = 1 \Rightarrow \sqrt{\frac{ra^2}{r}} (\frac{ra}{a}) = \frac{r}{r} \Rightarrow \frac{ra^2}{r} \cdot \frac{ra}{a} = \frac{1}{a}$

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



$(1, +\infty) \in Df \rightarrow L_m < 1 \rightarrow m > 0, f' = \frac{m(m-1) - r}{(m+m-1)^2} < 0$

$\therefore m^2 - m - r = (m-r)(m+1) < 0$

$\left. \begin{matrix} -1 < m < r \\ \Rightarrow 0 < m < r \\ m < 1 \end{matrix} \right\} \text{محل}$

$f(x) = \begin{cases} \frac{x}{1-x^2} & x \geq 0 \\ \frac{x}{1+x^2} & x < 0 \end{cases}$

$x \geq 0 \xrightarrow{\text{نسبت}} \frac{1-x^2 - (-2x)(x)}{(1-x^2)^2} \Rightarrow \frac{1-x^2+2x^2}{(1-x^2)^2} \Rightarrow \frac{1+x^2}{(1-x^2)^2}$

$x < 0 \xrightarrow{\text{نسبت}} \frac{1-x^2 - (2x)(x)}{(1+x^2)^2} \Rightarrow \frac{1-x^2-2x^2}{(1+x^2)^2} \Rightarrow \frac{1-3x^2}{(1+x^2)^2}$

$1-x^2 > 0 \Rightarrow x^2 < 1 \Rightarrow x \in (-1, 1)$

$1-3x^2 > 0 \Rightarrow 1 > 3x^2 \Rightarrow \frac{1}{3} > x^2 \Rightarrow x \in (-\frac{1}{\sqrt{3}}, \frac{1}{\sqrt{3}})$

\Rightarrow نقطه بحرانی