

$$x = \begin{cases} ry - 1 & y \geq 1 \\ -y^2 & y > 1 \end{cases} \rightarrow x = ry - 1 \rightarrow y = \frac{x+1}{r} \Rightarrow \frac{x+1}{r} \geq -\frac{1}{r+1} \rightarrow x \geq -1$$

$$x = -y^2 \rightarrow y^2 = -x \rightarrow y = \pm \sqrt{-x} \quad y > 1 \Rightarrow \begin{cases} \textcircled{1} +\sqrt{-x} > 1 \rightarrow -x > 1 \\ \textcircled{2} -\sqrt{-x} > 1 \rightarrow -x < -1 \end{cases} \Rightarrow x < -1$$

$$\Rightarrow y = \begin{cases} \frac{x+1}{r} & x \geq -1 \\ \sqrt{-x} & x < -1 \end{cases}$$

طبق شکل صیغه‌ها مورد توجه قرار دارد
در نقطه تقاطع نیز به ترتیب رابطه تابع است

$$g(x) = \sqrt{\frac{x f(x-r)}{f(x)}} \rightarrow \frac{x f(x-r)}{f(x)} \geq 0$$

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$$D_f: (-\infty, -r] \cup [0, r) \cup [r, +\infty)$$

$$f(x) = \frac{rx^2 - rx + r}{x^2 - x} = \frac{r(x^2 - x + 1)}{x(x+1)(x-1)}$$

$$\text{الف) } D_f: x(x+1)(x-1) \neq 0 \rightarrow D_f: \mathbb{R} - \{0, -1, 1\}$$

$$\Rightarrow \sqrt{f(x)} \rightarrow \sqrt{\frac{rx^2 - rx + r}{x(x+1)(x-1)}} \geq 0 \rightarrow \frac{rx^2 - rx + r}{x(x+1)(x-1)} \geq 0$$

$D: (-1, 0) \cup (1, +\infty)$

$$\text{الف) } y = \sqrt{\frac{x-1}{x^2 - rx^2 - 1}} \rightarrow \frac{x-1}{(x^2 - rx^2 - 1)} \geq 0 \rightarrow \frac{x-1}{(x+1)(x-1)} \geq 0 \rightarrow \frac{-1}{x+1} \geq 0$$

$D_f: (-1, +\infty) - \{1\}$

$$\text{ب) } y = \frac{rx^2 + 1}{x - r[-x]} \rightarrow \frac{rx^2 + 1}{x - r[-x]} \geq 0 \rightarrow \frac{rx^2 + 1}{x + r} \geq 0$$

$D_f: \mathbb{R} - [-r, r)$

$$\text{الف) } f(x) = \frac{\sqrt{x(x+1)}}{\sqrt{|x|+x}} \rightarrow \begin{cases} \textcircled{1} x(x+1) \geq 0 \rightarrow [-1, 0] \cup [0, +\infty) \\ \textcircled{2} |x|+x > 0 \rightarrow x > 0 \end{cases} \Rightarrow D_f: [1, +\infty)$$

$$\text{ب) } f(x) = \frac{\sqrt{|x-1|-x^2}}{|x|-1} \rightarrow \begin{cases} \textcircled{1} |x-1|-x^2 \geq 0 \rightarrow |x-1| \geq x^2 \rightarrow x-1 \geq x^2 \rightarrow x^2 - x + 1 \leq 0 \rightarrow (x+1)(x-1) \leq 0 \rightarrow [-1, 1] \\ \textcircled{2} |x|-1 \neq 0 \rightarrow x \neq 1, -1 \end{cases} \Rightarrow D_f: [-1, -1) \cup (-1, 1)$$

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