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$$x^r - ax + b = 0$$

$$\begin{array}{c} 1 \quad r \\ + \quad - \quad + \end{array} \quad \alpha\beta = r = b \quad a+b = v$$

$$y = ((k-r)x + m-1)(x-rn)^r$$

$$\begin{array}{c} -1 \quad r \\ + \quad - \quad + \end{array} \quad \begin{array}{c} x = rn \\ -1 = rn \\ -1 = n \end{array}$$

$$y = ((k-r)x + m-1)(x+1)^r$$

$$r(k-r) + m-1 = 0$$

$$rk - r^2 + m - 1 = 0 \quad \boxed{rk + m = r^2 + 1} \quad r=1 \rightarrow \boxed{m=2}$$

$$\frac{m}{n} + k = \frac{A}{r} + 1 = \boxed{-1}$$

$$x=1+y > 0 \rightarrow (k-r+m-1)(r) > 0$$

$$k+m-r > 0 \quad \boxed{k+m > r} \rightarrow m = r^2 - k \rightarrow k + r^2 - k > r$$

$$r > k \rightarrow k < r \xrightarrow{k \in \mathbb{N}} 1 \leq k < r \rightarrow \boxed{k=1}$$

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

$$\frac{1}{r} x^r + rx + y > \frac{v}{r}$$

$$\frac{1}{r} x^r + rx + \frac{y}{r} > 0$$

$$x^r - rx - y < 0 \quad \delta \in (-1, 0)$$

$$\begin{array}{c} -1 \quad A \\ + \quad - \quad + \end{array} \Rightarrow (a, b) = (-1, 0) \Rightarrow b-a = \boxed{-1}$$

$$\begin{cases} x=0 \\ y = x^r - rx^r - x + r \end{cases}$$

$$\begin{cases} x^r - rx^r - x + r < 0 \\ x^r(x-r) - (x-r) < 0 \\ (x-r)(x^r-1) < 0 \end{cases}$$

$$\begin{array}{c} -1 \quad 1 \quad r \\ + \quad - \quad + \end{array} \quad \boxed{x > 0}$$

$$(1, r) = (a, b) \quad \downarrow \quad \frac{1-r}{r} = r$$

$$f(r) = 1 - 1r - r + r = \boxed{-r}$$

$$(a-1)x^r + (a-1)x + 1 < 0 \rightarrow \Delta < 0 \rightarrow a^r + 1 - ra - \epsilon a + \epsilon < 0$$

$$\textcircled{1} a-1 < 0 \quad a < 1$$

$$a^r - ra + 1 < 0 \quad +A \quad \downarrow \quad r$$

$$\begin{array}{c} 1 \quad A \\ + \quad - \quad + \end{array} \rightarrow a \in (1, A)$$

$$\textcircled{1} \cap \textcircled{2} \rightarrow \emptyset$$

$$\frac{m(m^r+m)}{m-r} = \frac{m^r(m^r+1)}{m-r} \rightarrow +$$

$$\begin{array}{c} m-r > 0 \\ \boxed{m > r} \end{array}$$

$$\frac{(x^r-x-y)(x-1)^r}{(x^r+x+1)(r-x)^r} < 0$$

$$\frac{(x-r)(x+y)(x-1)^r}{(x^r+x+1)(r-x)^r} < 0$$

$$\begin{array}{c} -r \quad 1 \quad r \quad r \\ + \quad - \quad - \quad + \end{array}$$

$$[-r, r) \cup [r, +\infty)$$

$$\frac{rx^r - rx}{x^r + r} < r \xrightarrow{x \in \mathbb{R}} rx^r - rx < rx^r + 1 \rightarrow x^r - rx - 1 < 0 \rightarrow \begin{array}{c} -r \quad r \\ + \quad - \quad + \end{array} \quad (-r, \epsilon)$$

$$(-r, \epsilon) = (a, b) \rightarrow b-a = \boxed{r}$$

$$\underbrace{-1 < \frac{rx^r - rx}{x+1} < 0}_{\textcircled{1}}$$

$a > 0, \Delta < 0 \rightarrow +$ or $-$

$$\textcircled{1} \quad \frac{x(rx - r)}{x+1} > -1 \rightarrow \frac{x(rx - r) + x + 1}{x+1} > 0 \rightarrow \frac{rx^r - rx + x + 1}{x+1} > 0 \quad \begin{matrix} \nearrow \\ x+1 > 0 \\ \boxed{x > -1} \end{matrix}$$

$$\textcircled{2} \quad \frac{rx^r - rx}{x+1} < 0 \rightarrow \frac{x(rx - r)}{x+1} < 0 \rightarrow \begin{matrix} -1 & 0 & \frac{r}{r} \\ | & | & | \\ - & + & - \\ 0 & 0 & 0 \end{matrix} \rightarrow (-\infty, -1) \cup (0, \frac{r}{r})$$

$$\underline{\textcircled{1} \cap \textcircled{2}} \quad (0, \frac{r}{r})$$

$$\frac{x^r - 1}{x} \leq 0 \rightarrow \frac{x^r - rx - 1}{x} \leq 0 \quad \frac{(x-0)(x+1)}{x} \leq 0 \quad \begin{matrix} -r & 0 & 1 \\ | & | & | \\ - & + & - \\ 0 & 0 & 0 \end{matrix}$$

$$(-\infty, -r] \cup (0, 1]$$