

$x^2 - ax + b$ $\xrightarrow{\text{ریشه ها}}$ $x = 1, x = 3$ $\xrightarrow{\text{سبب}}$ (1)

$x^2 - ax + b = (x-1)(x-3) \rightarrow x^2 - ax + b = x^2 - 4x + 3$

مقایسه: $a = 4, b = 3$ \cdot $a + b = 7$

$x = -1 \rightarrow -1 = 3n \rightarrow n = -\frac{1}{3}$ (2)

$x = 4 \rightarrow 4k - 1 + m - 1 = 0 \rightarrow 4k + m - 2 = 0$
 $\hookrightarrow 4k + m = 2$

\rightarrow

x	-1	4
p	$+p$	$-$

$\rightarrow \frac{4k + m - 2}{k + 4k} < 0 \rightarrow k < 2 \rightarrow k \in \mathbb{N} \rightarrow k = 1, m = 0$

$\Rightarrow \frac{0}{-\frac{1}{3}} = -1 \cdot 0 + 1 = -1 \frac{1}{3}$

$-\frac{1}{3}x^2 + 2x + 4 > \frac{7}{3} \rightarrow -\frac{1}{3}x^2 + 2x + 4 - \frac{7}{3} > 0 \rightarrow$ (3)

$(-\frac{1}{3}x^2 + 2x + \frac{5}{3})^{x-2} \rightarrow x^2 - 6x + 5 < 0 \rightarrow (x-5)(x-1) < 0$

$(-1, 5) \leftarrow$

-1	5
$+$	$-$
$+$	$+$

$x = 5$
 $x = -1$

$b - a = 5 - (-1) = 6$

$x(x^2 - 1) - 3(x^2 - 1) \rightarrow (x-1)(x+1)(x-3)$ (4)

$f(2) = 1 - 4 - 2 + 3 = -2$

-1	1	3
$-$	$+$	$-$

$(a, b) = (1, 3)$

$\frac{2}{3} = \frac{1+3}{3}$: نقطه میانی

$$(a-1)x^2 + (a-1)x + 1 \begin{cases} a < 0 \rightarrow (a-1) < 0 \rightarrow a < 1 \quad (1) \\ \Delta < 0 \rightarrow b^2 - 4ac < 0 \end{cases} \quad (a)$$

$$(a-1)^2 - 4(a-1)(1) < 0$$

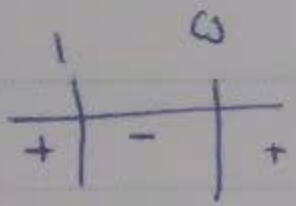
$$a^2 - 4a + 4 < 0$$

$$\leftarrow (a-1)(a-3) < 0$$

$$a = 1, 3$$

$$a \in (1, 3) \quad (2)$$

$$(1) \cap (2) = \emptyset$$



$$\frac{m(m^2+m)}{m-2} > 0$$

$$m-2 = 0 \rightarrow m = 2$$

$$m(m^2+m) = 0 \rightarrow m = 0$$

$$\downarrow$$

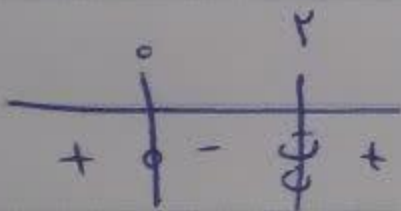
$$m^2+m = 0 \rightarrow m(m+1) = 0$$

$$m = 0$$

$$m+1 = 0 \rightarrow$$

$$m = -1$$

$$\rightarrow m \in (-\infty, 0] \cup (2, +\infty)$$



$$\frac{(x^2-x-4)(x-1)^2}{(x^2+x+1)(2-x)^2} \leq 0$$

$$x^2-x-4 = 0 \rightarrow (x+2)(x-3) = 0$$

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

$$x-1 = 0$$

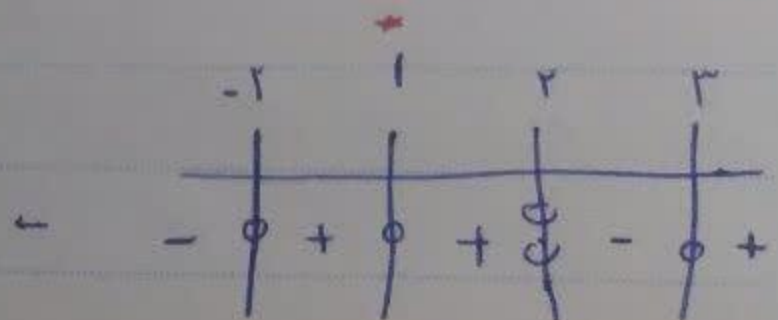
$$x = 1$$

$$x^2+x+1 = 0 \rightarrow \Delta < 0$$

ریشه ندارد + همیشه مثبت

$$2-x = 0 \rightarrow x = 2$$

$$x \in (-\infty, -2] \cup (2, 3]$$



Subject: ()

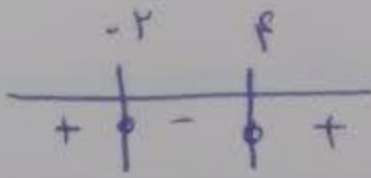
$$\frac{rx^r - rx}{x^r + f} < r \rightarrow \frac{rx^r - rx}{x^r + f} - r < 0 \rightarrow \frac{rx^r - rx - rx^r + r\Lambda}{x^r + f} < 0 \quad (8)$$

$$\frac{x^r - rx + \Lambda}{x^r + f} < 0$$

$$x^r - rx - \Lambda = 0 \rightarrow (x+r)(x-f) = 0$$

$$x = -r, x = f$$

$$x^r + f = 0 \rightarrow x^r = -f \quad \times$$



$$x \in (-r, f) \rightarrow b-a = f - (-r) = f+r$$

$$-1 < \frac{rx^r - fx}{x+1} < 0 \rightarrow \left\{ \begin{array}{l} \frac{rx^r - fx}{x+1} < 0 \rightarrow \end{array} \right.$$

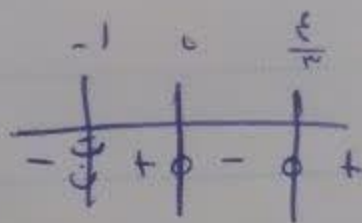
$$rx^r - fx = 0$$

$$x(rx - f) = 0$$

$$x = 0$$

$$x = \frac{f}{r}$$

$$(-\infty, -1) \cup (0, \frac{f}{r}) \quad (1)$$



$$x+1 = 0 \rightarrow x = -1$$

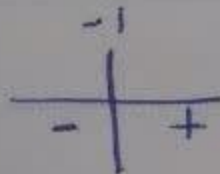
$$\frac{rx^r - fx}{x+1} > -1 \rightarrow \frac{rx^r - rx + 1}{x+1} > 0$$

$$rx^r - rx + 1 = 0$$

$$\Delta < 0$$

$$x+1 = 0 \rightarrow x = -1$$

$$(-1, +\infty) \quad (2)$$



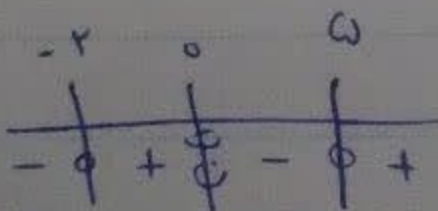
$$(1) \cap (2) \quad (0, \frac{f}{r})$$

$$\frac{x^r - 10}{x} \leq r \rightarrow \frac{x^r - 10 - rx}{x} \leq 0$$

$$x^r - rx - 10 = 0$$

$$(x+r)(x-0) = 0$$

$$x = -r, x = 0$$



$$x = 0$$

$$x \in (-\infty, -r] \cup (0, 0]$$