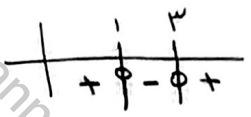
۱) ۲ آذر

$x^2 - ax + b$



$f(2) = 4 - 2a + b < 0$

$f(1) = 1 - a + b = 0 \rightarrow b - a = -1$

$f(3) = 9 - 3a + b = 0 \rightarrow b - 3a = -9$

$a = 4 \Rightarrow a + b = 7$

$b = 3$

۲)

$y = ((k-2)x + m - 1)(x - 3n)^2$

$x - 3n = 0 \rightarrow -1 - 3n = 0$ ($x = -1$)

$3n = -1$

$n = -\frac{1}{3}$

منفی یا صفر

یکی از ضریب‌های x باید

$x = 4 \rightarrow 4k - 8 + m - 1 = 4k + m - 9 = 0$

$4k + m = 9 \xrightarrow{k=1} m = 5$

$k - 2 < 0 \rightarrow k < 2$

$k \in N \rightarrow k = 1$

$\frac{m}{n} + k$

$\frac{5}{-\frac{1}{3}} + 1 = -15 + 1 = -14$

۳)

$y = -\frac{1}{2}x^2 + 2x + 9$

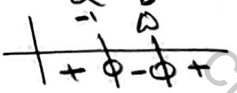
$-\frac{1}{2}x^2 + 2x + 9 > \frac{7}{2} \rightarrow -\frac{1}{2}x^2 + 2x + 9 - \frac{7}{2} > 0$

$\times 2 \rightarrow -x^2 + 4x + 18 - 7 > 0$

$\times -1 \rightarrow x^2 - 4x - 11 < 0$

$(x - 5)(x + 1) < 0 \rightarrow$

$x = 5 \quad x = -1$



$b = (-1)^{5+1} = 6$

۴)

$f(x) = x^3 - 3x^2 - x + 3$

$x^3 - x^2$

$-2x^2 - x + 3$

$-2x^2 + 2x$

$-3x + 3$

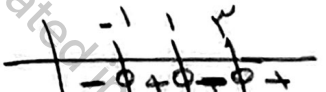
$-3x + 3$

0

$x^3 - 2x - 3 = (x - 3)(x + 1)$

$\Rightarrow (x - 1)(x + 1)(x - 3)$

$x = 1 \quad x = -1 \quad x = 3$



بازه‌ی اول و سوم = منفی

بزرگترین بازه

$f(2) = 8 - 12 - 2 + 3 = -3$

(۳)

$(a-1)x^2+(a-1)+1$

$a<0 \Rightarrow a-1<0 \rightarrow a<1$

$\Delta = b^2-4ac = (a-1)^2-4(a-1)(a-1) = a^2-6a+5$

$\Delta<0$ — a^2+1-2a — $-4a+4$

$(a-5)(a-1)<0$

$a=5$ $a=1$

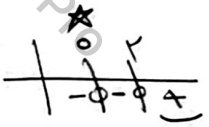
$1<a<5$

$\rightarrow \emptyset$ ✓ ✗

(۴)

$\frac{m(m^3+m)}{m-2} = \frac{m(m(m^2+1))}{m-2}$ — $m=0$ ناقدر به حقیقی

$\frac{m^2(m^2+1)}{m-2} \rightarrow$ $m=2$



$m \in (2,+\infty)$ ✓ ✗

(۷)

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

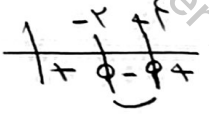
ناقدر به حقیقی

$x \in [-2,2) \cup [3,+\infty)$ ✓ ✗

(۸)

$f(x) = \frac{3x^2-2x}{x^2+4} < 2 \rightarrow \frac{3x^2-2x-2x^2-8}{x^2+4} < 0$

$\frac{x^2-2x-8}{x^2+4} < 0 \rightarrow \frac{(x-4)(x+2)}{(x^2+4)} < 0 \rightarrow$ $x=4$ $x=-2$



ناقدر به حقیقی

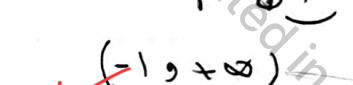
$b-a = 4-(-2) = 6$ ✓ ✗

$\Rightarrow (0,\frac{4}{3})$ ✓ ✗

(۶)

$-1 < \frac{3x^2-4x}{x+1} < 0$

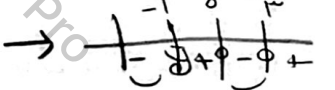
$\begin{cases} -1 < \frac{3x^2-4x}{x+1} \rightarrow 0 < \frac{3x^2-4x+x+1}{x+1} \rightarrow \frac{3x^2-3x+1}{x+1} > 0 \rightarrow \end{cases}$ ناقدر به حقیقی



$x=-1$

$(-1,+\infty)$ ✓ ✗

$\begin{cases} \frac{3x^2-4x}{x+1} < 0 \rightarrow \frac{x(3x-4)}{x+1} < 0 \rightarrow \end{cases}$ $x=0$ $x=\frac{4}{3}$



$x=-1$

$(-\infty,-1) \cup (0,\frac{4}{3})$ ✓ ✗

(1.)

$$\frac{x^2-10}{x} \leq 3 \rightarrow \frac{x^2-10-3x}{x} \leq 0 \longrightarrow \frac{(x-5)(x+2)}{x} \leq 0$$

$x=5$ ↑ , $x=-2$ ↑ , $x=0$ ↓

	$-\infty$		-2		0		5		$+\infty$
$x-5$	$-$	$-$	$-$	$-$	$-$	$-$	0	$+$	$+$
$x+2$	$-$	0	$+$	$+$	$+$	$+$	$+$	$+$	$+$
x	$-$	$-$	$-$	0	$+$	$+$	$+$	$+$	$+$
$\frac{(x-5)(x+2)}{x}$	$-$	0	$+$	$\|$	$-$	$\|$	0	$+$	$+$

$$x \in (-\infty, -2] \cup (0, 5]$$