۲۵

۱) x^2-ax+b

۳ ← ریشه‌ها ← دوتا ریشه داشته باشد ← $(x-1)(x-3)$ ← $x^2-\overset{a}{4}x+\overset{b}{3}$ ← $a+b=4+3=7$

۲) $y=\left((k-2)x+m-1\right)(x-3x^2)$ $\xrightarrow{x=0}$ $+(k-2)+m-1 \Rightarrow^{*} k+m=0$

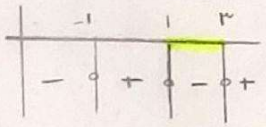
$k-2<0 \rightarrow k<2$ ← تنها عدد صحیح $k=1$ $\xrightarrow{*}$ $1-9+m=0 \rightarrow m=8$ $\rightsquigarrow \frac{8}{-\frac{1}{3}}+1=-24+1=-23$

$(x-1)^2 \rightarrow x^2+9x^2-6x \xrightarrow{x=0} 1+9x^2+6x \rightarrow x=-\frac{1}{3}$

۳) $y=-\frac{1}{2}x^2+2x+4 > \frac{7}{2}$

$-\frac{x^2}{2}+2x+\frac{1}{2}>0 \xrightarrow{\times -2} x^2-4x-1<0 \rightarrow \frac{(x+1)}{-1}\frac{(x-3)}{3} \rightarrow \overset{a}{(-1}, \overset{b}{3}) \rightsquigarrow 3+1=4$

۴) $x^4-3x^2-x+3 \rightarrow \underbrace{(x-1)}_{1}\underbrace{(x+1)}_{-1}\underbrace{(x-3)}_{3}$



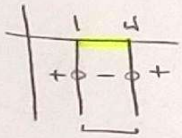
جدول $x<0$

$(1,3) \xrightarrow{x=2} 8-12-2+3=-3 \rightarrow (2,-3)$

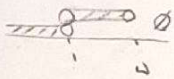
۵) $(a-1)x^2+(a-1)x+1$ ← همواره مثبت $\begin{cases} a>0 \\ \Delta<0 \end{cases}$

① $a-1<0 \rightarrow a<1$

② $(a-1)^2-\underbrace{4(a-1)}_{4a-4} = a^2+1-2a-4a+4 = \underbrace{a^2-6a+5}_{(a-1)(a-5)}<0$



$1<a<5$



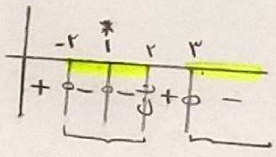
①∩② $\rightarrow \emptyset$

۶) $\frac{m(m^4+m)}{m-2}$ ← صدات همواره مثبت است ← پس کافیست فقط مخرج نیز همواره مثبت باشد

$\begin{cases} *\ m^4+m^2 \rightarrow m^2(m^2+1)>0 \ \checkmark \\ m-2>0 \rightarrow m>2 \end{cases}$

۷) $\frac{(x^2-x-6)(x-1)^2}{(x^2+x+1)(2-x)^3} \rightarrow \frac{\overset{-2}{(x+2)}\overset{3}{(x-3)}\overset{1}{(x-1)^2}}{\underbrace{(2-x)^3}_{-(x-2)^3}}$

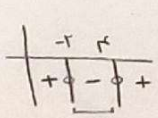
دلیل: همیشه بزرگتر از صفر



$[-2,2) \cup [3,+\infty)$

۸) $\frac{3x^2-2x}{x^2+4}<2 \rightarrow 3x^2-2x<2x^2+8$

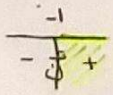
$x^2-2x-8<0 \rightarrow \frac{-2}{(x+2)}\frac{4}{(x-4)}$



$(-2,4) \rightarrow b-a=6$

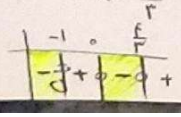
a b

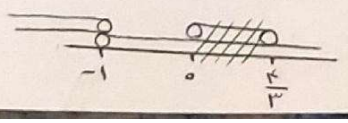
۹) $1<\frac{3x^2-4x}{x+1} \xrightarrow{+1} 0<\frac{3x^2-4x+x+1}{x+1} \rightarrow \frac{3x^2-3x+1}{\frac{x+1}{-1}}>0$ ← همیشه مثبت



$x(3x-4) \rightarrow x=0$ ، $x=\frac{4}{3}$

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

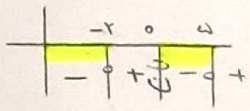




$\cup \rightarrow (0,\frac{4}{3})$

۱۰) $\frac{x^2-10}{x} \leq 3 \xrightarrow{-3} \frac{x^2-10-3x}{x} \leq 0$

$\frac{\overset{-2}{(x+2)}\overset{5}{(x-5)}}{x} \leq 0$



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