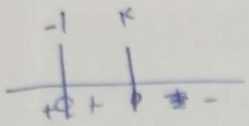
-۱

$(1,3)$ بازه $\Rightarrow$ $1,3$ ریشه‌ها $\Rightarrow (x-1)(x-3) = x^2-4x+3$

a b c

$\Rightarrow a+b=7$

-۲



$\Rightarrow -1$ ریشه مضاعف $\Rightarrow$ دلتا $\Rightarrow (x-2m)^2 \Rightarrow 4m=1 \Rightarrow m=\frac{1}{4}$

$\Rightarrow k-2=-1 \Rightarrow k=1$

2 ریشه $\Rightarrow$ دلتا $((k-1)x+m-1) \longrightarrow m-1=2 \Rightarrow m=3$

$\frac{m}{n}+k = \frac{3}{\frac{1}{4}}+1 = 13$

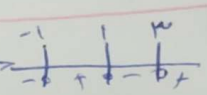
$\star$ ضابطه $\longrightarrow (x-4)(x+1)^2$

-۳

$g=-\frac{1}{2}x^2+2x+3 > \frac{7}{2} \Rightarrow g > \frac{7}{2}$

$x^2 \longrightarrow x^2-4x-5 = (x-5)(x+1) < 0$ $\Rightarrow -1<x<5 \Rightarrow b-a=5-(-1)=2$

$x^3-4x^2-x+4 = (x-1)(x+1)(x-4)$



$x>0$, $g<0$ $\Rightarrow (1,4)$ $\frac{1+4}{2}=2.5$ — نقطه‌ی میانی

$f(2) = 8-12-4+4 = -4$

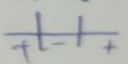
-۵

$(a-1)x^2+(a-1)x+1 < 0 \Rightarrow$

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

$\Delta < 0 \Rightarrow (a-1)^2-4(a-1) = (a-1)(a-5) \Rightarrow$

$(1,5)$

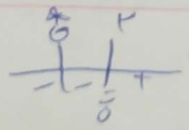


اشتراک $\longrightarrow (I) \cap (II) = \emptyset$

$\Rightarrow$

-۶

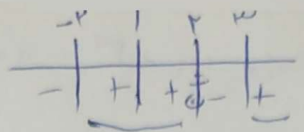
$\frac{m^2(m^2+1)}{m-2} > 0$ $\longrightarrow$



$\longrightarrow (2, +\infty)$

۷-

$$\frac{(x-2)(x+2)(x-1)^2}{(x^2+x+1)(2-x)^3} \le 0 \longrightarrow$$



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

۸-

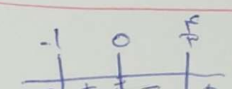
$$\frac{x^2-2x-2}{x^2+4} \ge 0 \Rightarrow x^2-2x-1 \ge 0 \Rightarrow x_{1,2} = 1 \pm \sqrt{2}$$

$$b-a = 4-(-2) = 6$$

۹-

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

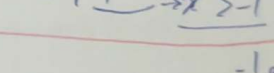
$$\frac{2x^2-4x}{x+1} \le 0 \Rightarrow$$



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

$$\hookrightarrow x = -1$$

$$\Rightarrow$$

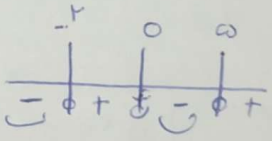


$$\Rightarrow x > -1$$

$$(-1,+\infty) \cap \left((0,\tfrac{2}{3}) \cup (-1,-\infty) \right) = (0,\tfrac{2}{3})$$

۱۰-

$$\frac{x^2-10}{x} \ge 2x \Rightarrow \frac{x^2-2x-10}{x} \ge 0 \longrightarrow$$



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