① $(x-1)(x-3) = x^2-4x+3$ $\quad a+b = 4+3 = 7$

	1	3	
	+	−	+

② $(x-3n)^2 = (x+1)^2 \Rightarrow 3n = -1 \Rightarrow n = \frac{-1}{3}$

$(1-2)x+m-1 \xrightarrow{x=4} -4+m-1=0 \quad m-5=0 \Rightarrow m=5$

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

	-1	4	
	+	+	−

نتیجه‌ی گیوم ← علامت x^3 منفی است ← چون x^2 مثبت است ← پس $k-2<0 \Rightarrow k<2$ طبیعی $\Rightarrow k=1$

③ $-\frac{1}{2}x^2+2x+4 > \frac{7}{2} \xrightarrow{\times 2} -x^2+4x+12 > 7 \rightarrow -x^2+4x+5 > 0 \rightarrow x^2-4x-5 < 0$

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

	-1	5	
	+	−	+

$(a,b) \Rightarrow (-1,5) \Rightarrow 5-(-1) = 6$

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

	-1	1	3	
	−	+	−	+

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

$x=2 \Rightarrow 8-2+3-12 = -3$

⑤ $(a-1)x^2+(a-1)x+1$

$a-1<0 \rightarrow \boxed{a<1}$ *

$\Delta<0 \rightarrow (a-1)^2-4(a-1) = a^2+1-2a-4a+4 = a^2-6a+5 < 0$

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

	1	5	
	+	−	+

$\boxed{1<a<5}$ *

* * $\rightarrow$ اشتراک می‌گیریم $\Rightarrow \varnothing$

⑥ $\frac{m(m^3+m)}{m-2} > 0 \xrightarrow{\div m^2} \frac{m^2(m^2+1)}{m-2} > 0$ ← همواره مثبت

	0	2	
	−	−	+

$\boxed{m>2}$

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

$\Delta<0$ همواره +

	-2	1	2	3	
	+	−	−	+	−

جواب $= [-2,2) \cup [3,+\infty)$

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

	-2	4	
	+	−	+

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

⑨ $\frac{x(3x-4)}{x+1} < 0$

	-1	0	$\frac{4}{3}$	
	−	+	−	+

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

	-1	
	−	+

اشتراک $\Rightarrow (-\infty,-1) \cup (0,\frac{4}{3})$

$(-1,+\infty)$

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

⑩ $\frac{x^2-10}{x}-3 \leq 0 \quad \frac{x^2-10-3x}{x} \leq 0$

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

	-2	0	5	
	−	+	−	+

x جواب $= (-\infty,-2] \cup (0,5]$