۱)

$x^2 - ax + b = (x-1)(x-3) = x^2 - 4x + 3 \Rightarrow x = -4,\ b = 3 \rightarrow a + b = 7$

۲) $x - 3x = x + 1 \rightarrow x = -\frac{1}{3}$ $\quad x = 4 : (k-2)x + (m-1) = 0 \rightarrow 4k - 8 + m - 1 = 0 \rightarrow m = 9 - 4k \rightarrow$

$4k + m = 9$

x	$*$	-1	4
P	$+$	$+$	$-$

$\rightarrow 5k + m - 11 < 0 \rightarrow k < 2 \xrightarrow{\text{KEW}} k = 1 \Rightarrow m = 5$

$\Rightarrow \frac{5}{1} = 5 \quad 1 + 5 = -1 + 5$

$\frac{5}{-1}$ $\quad -\frac{1}{3}$

۳) $-\frac{1}{4}x^2 + 2x + 4 > \frac{7}{4}$ $\quad -x^2 + 4x + 5 > 0$ $\quad x = \frac{4 \pm \sqrt{36}}{2} \rightarrow -1, 5$

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

۴) $F(x) = (x^3 - 3x^2 - x + 3) \rightarrow x^2(x-3) - (x-3) = (x-3)(x^2-1)$

$= (x-3)(x-1)(x+1)$ $\quad -1 \quad 1 \quad 3$

$- \quad + \quad - \quad +$ $\quad (a,b) = (1,3) \rightarrow$ نقطه ۲

$F(2) = 1 - 12 - 2 + 3 = -3$

۵) $a - 1 < 0 \rightarrow a < 1$ $\quad \Delta < 0 \rightarrow (a-1)(a-5) < 0$ $\quad 1 \quad 5$ $\quad + \quad - \quad +$

$\Rightarrow 1 < a < 5 \rightarrow a < 1 \cap 1 < a < 5 = \emptyset$ برای هیچ مقدار حقیقی a وجود ندارد

۶) $\frac{m(m^3+m)}{m-2} > 0$ $\quad m - 2 \neq 0 \quad m(m^3+m) = 0 \rightarrow m = 0$

$m \neq 2$ $\quad \rightarrow m^3 + m = 0 \begin{cases} m^2 = -1 \text{ ق ق ج} \\ \rightarrow m = 0 \checkmark \end{cases}$

$+$

$\frac{m^2(m^2+1)}{m-2}$ $\quad \frac{m(m(m^2+1))}{m-2} = \frac{m^2(m^2+1)}{m-2}$ $\quad m - 2 > 0 \rightarrow m > 2$ $\quad 0 \quad 2$ $\quad - \quad + \quad +$

$\Rightarrow (2, +\infty)$

۷) $\frac{(x^2-x-6)(x-1)^2}{(x^2+x+1)(4-x)^3} < 0$ $\quad x^2 - x - 6 = 0$

$x = 3 \quad x = -2$

(x^2+x+1) همواره $+$ $\quad (4-x)^3$

	-2	1	2	3
	$+$	$-$	$-$	$+$	$-$

$[-2, 1] \cup [1, 2) \cup [3, +\infty)$

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

$x^2 + 4$ همواره $+$

$\rightarrow x^2 - 2x - 8 < 0$ $\quad (x-4)(x+2) < 0$ $\quad -2 \quad 4$ $\quad + \quad - \quad +$ $\rightarrow (-2, 4)$ $\rightarrow b - a = 4 - (-2) = 6$

۹) تجزیه صورت $\rightarrow 3x^2-4x = x(3x-4)$ ، ریشه‌ها: $0, \frac{4}{3}$

	$-\infty$		0		$\frac{4}{3}$		$+\infty$
x	$-$	$-$	0	$+$	$+$	$+$	
$3x-4$	$-$	$-$		$-$	0	$+$	

$\rightarrow x \in [0, \frac{4}{3}]$

شرط: $x \neq -1$

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۱۰) $\frac{x^2-10}{x} - 2 \geq 0 \rightarrow \frac{x^2-2x-10}{x} \geq 0 \rightarrow \frac{(x+2)(x-5)}{x} \geq 0$

ریشه‌ها: $-2, 0, 5$

	$-\infty$		-2		0		5		$+\infty$
$x+2$	$-$	$-$	0	$+$	$+$	$+$	$+$		
$x-5$	$-$	$-$	$-$	$-$	$-$	$-$	0	$+$	
x	$-$	$-$	$-$	$-$	0	$+$	$+$	$+$	

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