

ریشه ها ۱ و ۳ →
 $x^2 - ax + b \rightarrow (x-1)(x-3) \rightarrow x^2 - \underbrace{4x}_a + \underbrace{3}_b$
 $a+b = 4+3 = \boxed{7}$

$y = ((k-2)x + m-1)(x-3x)^2$ $\frac{m}{n} + k = \frac{9-4k}{3} + k$ (۲)
 $\varepsilon k - 1 + m - 1 = 0 \rightarrow m = -\varepsilon k + 2$ $\frac{-1}{3} \rightarrow 12k - 2V + k = 13k - 2V$
 $(-1-3x)^2 = 0 \rightarrow -3x = 1 \rightarrow x = -\frac{1}{3}$ $13k - 2V = \boxed{-14}$

$y = -\frac{1}{4}x^2 + 2x + 4$ $-\frac{1}{4}x^2 + 2x + \frac{a}{4} = 0 \rightarrow a+c=b \rightarrow (a_{\text{ریشه}})x = -1, +\Delta$ (۳)
 $\rightarrow x \rightarrow -1$ $(a, b) = (-1, \Delta) \rightarrow b-a = \Delta - (-1) = \boxed{4}$

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

$x > 0 \rightarrow (x^2-1)(x-3) < 0$ $x \in (1, 3) \rightarrow 2 = \text{نقطه مبانی}$
 $1 - 12 - 2 + 3 = \boxed{-3}$

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

$\Delta < 0 \rightarrow a^2 - 2a + 1 - 4a + 4 < 0 \rightarrow a^2 - 4a + 5 < 0 \rightarrow (a-2)(a-1) < 0$ $! a < \Delta$ (I)
 $a < 0 \rightarrow a-1 < 0 \rightarrow a < 1$ (II)

$a \in I \cap II \rightarrow a \in \emptyset$

$\frac{m(m^2+m)}{m-2} = \frac{m^2(m^2+1)}{m-2} \rightarrow m = 0, 1, -1, 2$ (۴)
 $m \in (-\infty, -1) \cup (0, 1) \cup (2, +\infty)$

$\frac{(x^2-x-4)(x-1)^2}{(x^2+x+1)(2-x)^3} \leq 0$

$x = -2, 1, 2, 3$
 $\frac{0}{\text{ریشه}}$

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

$$\frac{3x^2 - 2x}{x^2 + \varepsilon} < 1 \rightarrow 3x^2 - 2x < 3x^2 + \varepsilon \rightarrow \frac{3x^2 - 2x - \varepsilon}{x^2} < 0 \quad (1)$$

$$3x^2 - 2x - \varepsilon < 0 \rightarrow (x - \varepsilon)(x + 2) < 0 \rightarrow \text{(sign)} \quad x = \varepsilon, -2$$

$$(a, b) = (-2, \varepsilon) \rightarrow b - a = \varepsilon + 2 = \boxed{4}$$

$$-1 < \frac{3x^2 - \varepsilon x}{x + 1} < 0 \quad (2)$$

$$\frac{3x^2 - \varepsilon x}{x + 1} < 0 \quad \frac{3x^2 - \varepsilon x}{x + 1} > -1 \rightarrow 3x^2 - \varepsilon x > -x - 1$$

$$\rightarrow 3x^2 - 3x + 1 > 0 \rightarrow \text{sign}$$

$$\frac{x(3x - \varepsilon)}{x + 1} < 0$$

$$\text{(sign)} \quad x = 0, -1, \frac{\varepsilon}{3}$$

$$\Rightarrow x \in (-\infty, -1) \cup (0, \frac{\varepsilon}{3})$$

$$\frac{x^2 - 10}{x} \leq 1 \rightarrow x^2 - 10 \leq x \rightarrow x^2 - x - 10 \leq 0 \quad (3)$$

$$\rightarrow (x - 5)(x + 2) \leq 0 \rightarrow \text{(sign)} \quad x = 5, -2$$

$$\boxed{x \in [-2, 5]}$$