

1- $x^2 - ax + b \Rightarrow P = b = 3, S = 1 + 3 = 4 \Rightarrow a + b = 4 + 3 = 7$

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

باتوجه به جدول تعیین علامت
ضریب x^3 منفی بوده و همین در
 $(x+1)^2$ ضریب x^2 همواره + است $\Rightarrow k-2 < 0 \xrightarrow{k \in \mathbb{N}} k=1$

$x=4 \Rightarrow -4+m-1=0 \Rightarrow m=5$

$\frac{m}{n} + k = \frac{5}{-\frac{1}{3}} + 1 = -14$

3- $\frac{-1}{3}x^2 + 2x + 4 \Rightarrow \frac{1}{3}x^2 - 4x - 12 \Rightarrow -12 \Rightarrow x^2 - 4x - 12 < 0 \Rightarrow (x+1)(x-5) < 0$

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

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

$x=2 \Rightarrow (3-2)(1-2)(1+2) = -3$

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

$P = \frac{c}{a} = \frac{1}{a-1} > 0 \Rightarrow a > 1$

$\Delta < 0 \Rightarrow a^2 + 1 - 2a - 4a + 4 < 0 \Rightarrow (a-1)(a-3) < 0$

$(a-1)(a-3) < 0 \Rightarrow a \in (1, 3)$

مجموعه جواب: \emptyset

6- $\frac{m(m^3+m)}{m-2} > 0 \Rightarrow \frac{m^2(m^2+1)}{m-2} > 0$

$m^2+1=0 \Rightarrow m^2=-1 \Rightarrow$ همواره *

$m > 2$

7- $\frac{(x^2-x-6)(x-1)^2}{(x^2+x+1)(2-x)^3} < 0 \Rightarrow \frac{(x-3)(x+2)(x-1)^2}{(x^2+x+1)(2-x)^3} < 0$

مجموعه جواب: $S = [-2, 2) \cup [3, +\infty)$

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

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

↗ + هموار و $\Delta < 0$

$$-1 < \frac{\mu x^2 - \epsilon x}{x+1} < 0 \Rightarrow -1 < \frac{\mu x^2 - \epsilon x}{x+1} \Rightarrow 0 < \frac{\mu x^2 - \epsilon x + x + 1}{x+1} \Rightarrow 0 < \frac{\mu x^2 - \mu x + 1}{x+1} \Rightarrow \frac{-1}{-\frac{\epsilon}{\mu} + 1} \Rightarrow \textcircled{1} \boxed{x > -1},$$

$$\frac{\mu x^2 - \epsilon x}{x+1} < 0 \Rightarrow \frac{x(\mu x - \epsilon)}{x+1} < 0 \Rightarrow \frac{-1 \quad 0 \quad \frac{\epsilon}{\mu}}{-\frac{\epsilon}{\mu} + 1 \quad + \quad 0 \quad +} \Rightarrow \boxed{x \in (-\infty, -1) \cup (0, \frac{\epsilon}{\mu})}$$

مجموعه جواب $\Rightarrow \textcircled{1}, \textcircled{2} \Rightarrow \textcircled{3} = (0, \frac{\epsilon}{\mu})$

$$\frac{x^2 - 1}{x} \ll \mu \Rightarrow \frac{x^2 - 1 - \mu x}{x} \ll 0 \Rightarrow \frac{(x+1)(x-\omega)}{x} \ll 0 \Rightarrow \frac{-1 \quad 0 \quad \omega}{- \quad + \quad 0 \quad - \quad +} \Rightarrow \boxed{x \in (-\infty, -1] \cup (0, \omega]}$$