[illegible] شاکری - دهم ریاضی B - تکلیف جلسه ۲۶

۱- $x^2 - ax + b \longrightarrow$ roots $1,\ 3$: $+\ 0\ -\ 0\ +$ $\Rightarrow 1 - a + b = 0 \Rightarrow 4 - a = 0 \Rightarrow a = 4$

$\Rightarrow \frac{b}{1} = 3 \Rightarrow b = 3$

$\Rightarrow a + b = \boxed{7}$

۲- roots $-1^{*},\ 4$: $+\ 0\ +\ 0\ -$ $\longrightarrow (x-3n)^2 \rightarrow -1 - 3n = 0 \Rightarrow 3n = -1 \Rightarrow n = -\frac{1}{3}$

roots $-1^{*},\ 4$: $+\ 0\ +\ 0\ -$ $\Rightarrow (k-2)x + m - 1 \rightarrow 4k + m - 9 = 0$

$\rightarrow k - 2 < 0 \Rightarrow k < 2 \Rightarrow k = 1$

$\Rightarrow 4 + m - 9 = 0 \Rightarrow m = 5$

$\Rightarrow \frac{m}{n} + k = \frac{5}{-\frac{1}{3}} + 1 = -15 + 1 = \boxed{-14}$

۳- $y = -\frac{1}{2}x^2 + 2x + 6 > \frac{7}{2} \Rightarrow -\frac{1}{2}x^2 + 2x + \frac{5}{2} > 0 \Rightarrow$ roots $-1,\ 5$: $-\ 0\ +\ 0\ -$ $= (-1, 5)$

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

۴- $f_{(x)} = x^3 - 3x^2 - x + 3 \Rightarrow f_{(x)} = (x-1)(x^2 - 2x - 3)$

$\xrightarrow{x>0} (x-1)(x^2-2x-3) < 0 \rightarrow$ roots $-1,\ 1,\ 3$: $-\ 0\ +\ 0\ -\ 0\ +$

$\rightarrow (-\infty, -1) \rightarrow$ غ ق ق

$\rightarrow (1, 3) \Rightarrow a = 1,\ b = 3$

$\xrightarrow{\frac{3+1}{2} = 2} f_{(x)} = (x-1)(x+1)(x-3) = 1 \times 3 \times (-1) = \boxed{-3}$

۵- $a - 1 < 0 \Rightarrow a < 1$

$\Delta < 0 \Rightarrow (a-1)(a-1) - 4(a-1) < 0 \Rightarrow (a-1)(a-5) < 0 \rightarrow$ roots $1,\ 5$: $+\ 0\ -\ 0\ +$ $\Rightarrow a \in (1, 5)$

$a < 1$, $a \in (1,5)$ $\xrightarrow{\cap} \boxed{\varnothing}$

۶- $\frac{m^2(m^2+1)}{m-2} \longrightarrow$ roots $0,\ 2$: $+\ 0\ -\ 0\ +$ $\Rightarrow m \in (-\infty, 0) \cup (2, \infty)$

۷-

$$\frac{(x^2-x-6)(x-1)^2}{(x^2+x+1)(2-x)^3}\leq 0 \rightarrow$$

(roots: -2, 3, 1; x^2+x+1: $\Delta<0$; $2-x$: 2)

Sign chart: -2, 1^*, 2, 3: $+$ | $-$ | $-$ | $+$ | $-$

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

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

(roots: -2, 4; x^2+4: ریشه ندارد)

Sign chart: -2, 4: $+$ | $-$ | $+$

$$\Rightarrow x\in(-2,4)$$

$$\Rightarrow a=-2,\ b=4$$

$$\Rightarrow b-a=\boxed{6}$$

۹-

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

(roots: $\frac{4}{3}$, 0; $x+1$: -1)

Sign chart: -1, 0, $\frac{4}{3}$: $-$ | $+$ | $-$ | $+$

$$\Rightarrow x\in(-\infty,-1)\cup(0,\tfrac{4}{3})$$

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

($\Delta<0$; $x+1$: -1)

Sign chart: -1: $-$ | $+$

$$\Rightarrow x\in(-1,+\infty)$$

$$\xrightarrow{\cap} x\in(0,\tfrac{4}{3})$$

۱۰-

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

(roots: -2, 5; x: 0)

Sign chart: -2, 0, 5: $-$ | $+$ | $-$ | $+$

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