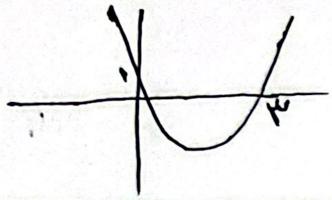
مهدی بابان نشاری — تکلیف شماره ۲۶ — کلاس ریس A دهم

$1<x<3 \to 1, 3 \to$ ریشه‌های معادله $\to y=a(x-\alpha)(x-\beta) \to y=(x-1)(x-3)$

$=x^2-4x+3 \to a=4, b=3$



$a+b \Rightarrow S=3+4=7$

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۲)

x		-1		4	
P	$+$	0	$+$	0	$-$

علامت تغییر نکرده در نتیجه ریشه مضاعف $=-1$

$y=((k-2)x+m-1)(x-3n)^2$

$\frac{m}{n}+k=\frac{5}{-\frac{1}{2}}+1=-14$

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

$\to -3n=1 \to n=-\frac{1}{3}$

$(k-2)x+m-1 \xrightarrow{x=4} 0=4k-8m-1 \Rightarrow 4k+m=$

$\xrightarrow{x=5} 0>5k+m-11 \Rightarrow k+4k+m<11 \to k+9<11 \Rightarrow \left.\begin{matrix} k<2 \\ k\in\mathbb{N}\end{matrix}\right\} k=1$

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۳)

$y=-\frac{1}{2}x^2+2x+6$

$\frac{7}{2}<-\frac{1}{2}x^2+2x+6 \Rightarrow 0<-\frac{1}{2}x^2+2x+\frac{5}{2} \to 0<-(x^2-4x-5)$

$\to(-x+5)(x+1)>0$

	-1		5	
$-$	0	$+$	0	$-$

$\to(-1,5)=(a,b) \Rightarrow \left.\begin{matrix} a=-1 \\ b=5\end{matrix}\right\} \xRightarrow{max} 5-(-1)=6$

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۴)

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

	-1		1		3	
$-$	0	$+$	0	$-$	0	$+$

$x>0$

$P_x=(1,3) \to \frac{1+3}{2}=2 \quad f(2)=2^3-3\times2^2-2+3=-3$

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۵)

$\Delta<0$

$a^2+1-2a-4(a-1)<0$

$a^2-6a+5<0 \to (a-1)(a-5)<0$

	1		5	
$+$	0	$-$	0	$+$

$\to(1,5)$

$a-1<0$

$\to a<1$

$a\in\varnothing$

۶).

$$\frac{m(m^3+m)}{m-2}=\frac{m^2(m^2+1)}{m-2}$$

$$\begin{array}{ccccc} & 0 & & 2 & \\ - & \circ & - & \bullet & + \end{array} \rightarrow D_m=(2,+\infty)$$

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۷).

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

$$\begin{array}{cccccccc} & -2 & & 1^{*} & & 2 & & 3 \\ + & \bullet & - & \bullet & - & \circ & + & \bullet & - \end{array} \longrightarrow [-2,2)\cup[3,+\infty)$$

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۸).

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

$$\begin{array}{ccccc} & -2 & & 4 & \\ + & \circ & - & \circ & + \end{array} \longrightarrow (-2,4) \xrightarrow{max} \left.\begin{array}{l} b=4 \\ a=-2 \end{array}\right\} b-a=6$$

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۹).

$$\frac{3x^2-4x}{x-1}<0 \Longrightarrow \frac{3x\left(x-\frac{4}{3}\right)}{x+1}<0 \qquad -1<\frac{3x^2-4x}{x+1}$$

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

$$\begin{array}{ccccccc} & -1 & & 0 & & \frac{4}{3} & \\ - & \circ & + & \bullet & - & \bullet & + \end{array} \qquad \begin{array}{ccc} & -1 & \\ - & \circ & + \end{array}$$

$$\longrightarrow D_x=\left(0,\frac{4}{3}\right)$$

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۱۰).

$$\frac{x^2-10}{x}\leq 3 \Longrightarrow \frac{x^2-3x-10}{x}\leq 0 \Longrightarrow \frac{(x-5)(x+2)}{x}\leq 0$$

$$\begin{array}{ccccccc} & -2 & & 0 & & 5 & \\ - & \bullet & + & \circ & - & \bullet & + \end{array} \longrightarrow D_x=(-\infty,-2]\cup(0,5]$$