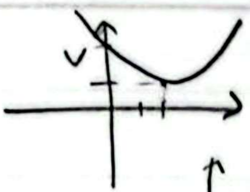
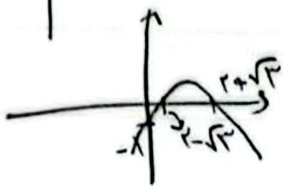
مهتاب قدیری

Date: ....



۱- الف) $y_s = 1 ,\ x_s = \frac{4}{2} = 2 ,\ \Delta < 0 ,\ a = 1$



ب) $a<0 ,\ \Delta < 0$ و $x_s = 2 ,\ y_s = 3 \Leftarrow$

$x_{1,2} = \frac{-4 \pm \sqrt{12}}{-2} = 2+\sqrt{3} ,\ 2-\sqrt{3}$

۲- الف) $\Delta > 0 \to (m+1)^2 - 8(\frac{1}{2}m+2) > 0 \to m^2 - 2m - 15 > 0$

$(m-5)(m+3) > 0$

	-3		5	
$+$		$-$		$+$

$\Rightarrow m < -3 ,\ m > 5$

ب) $\Delta = 0 \to m = -3 ,\ m = 5$

ج) $\Delta < 0 \to -3 < m < 5$

د) $\Delta \geq 0 \to m \leq -3 ,\ m \geq 5$

۳- الف) $\underbrace{\frac{c}{a}}_{x_1 x_2} > 0 \to \frac{10}{m-2} > 0 \to m > 2$ ، $\underbrace{\frac{-b}{a}}_{x_1 + x_2} < 0 \to \frac{2(m+1)}{m-2} < 0 \to m < -1$

m		-1		2	
$m+1$	$-$		$+$		$+$
$m-2$	$-$		$-$		$+$
	$+$		$-$		$+$

$\boxed{m>2}$

اشتراک $m>2$ و $-1<m<2$ تهی است.

ب) $S<0 \to \frac{-b}{a} < 0 \to \frac{2(m+1)}{m-2} < 0$

$P<0 \to \frac{c}{a} < 0 \to \frac{10}{m-2} < 0 \to m < 2$

m		-1		2	
$m+1$	$-$		$+$		$+$
$m-2$	$-$		$-$		$+$
	$+$		$-$		$+$

$\boxed{-1 < m < 2}$

۴- $y = (m-2)x^2 - 2(m+1)x + 10$

$\Delta > 0 \to 4(m+1)^2 - 40(m-2) > 0 \to m^2 - 8m + 21 > 0$

همواره $\oplus$

$\frac{c}{a} < 0 \to \frac{10}{m-2} < 0 \to m < 2$

$\boxed{m<2}$

ب) $x_s = -2 \to \frac{2(m+1)}{2(m-2)} = -2 \to -2m + 4 = m+1$

$\boxed{m=1}$

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-5 $\frac{2}{3}x^2-(2\sin\alpha)x+\frac{3}{2}=0 \Rightarrow \Delta\geq 0 \to 4\sin^2\alpha-4(\cancel{\frac{2}{3}})(\cancel{\frac{3}{2}})$

$\Rightarrow \underbrace{4\sin^2\alpha-4}_{=-4\cos^2\alpha}\geq 0 \to$ فقط $\Delta=0$ امکان دارد $\Rightarrow \cos\alpha=0 \to \frac{\pi}{2}, \frac{3\pi}{2}, \ldots$

$\frac{-b}{a}>0 \to \frac{2\sin\alpha}{\frac{2}{3}}=3\sin\alpha>0$

$\boxed{\alpha=\frac{\pi}{2}} \to \frac{2}{3}x^2-2x\frac{3}{2}=0 \Rightarrow x^2-3x+\frac{9}{4}=(x-\frac{3}{2})^2=0 \Rightarrow \boxed{x=\frac{3}{2}}$

-6 $y=\frac{(3x+1)(x-1)+(x+1)(2x-5)(-1)}{(x+1)(x-1)}=(3x+1)(2x-5)(-1)$

$x\neq 1, x\neq -1$

$f(x)=-6x^2+13x+5 \to y_s=\frac{-\Delta}{4a}\boxed{=12}$

-7 $mx^2-(m+3)-2=0$

$3(\alpha+\beta)-5\alpha\beta=7 \quad \alpha^2+\beta^2=?\quad \left\{\frac{3(m+3)}{m}+\frac{10}{m}=7 \to 3m+19=7m \quad \boxed{m=4}\right.$

$4x^2-6x-2=0 \to (\alpha+\beta)^2-2\alpha\beta=(\frac{6}{4})^2-2(\frac{-2}{4})=\frac{36}{16}+1=\frac{13}{4}$

$\boxed{\alpha^2+\beta^2=\frac{13}{4}}$

-8 $\frac{4\alpha+\beta^5}{5\beta^2}=? \to x^2-5x+2=0$

$\alpha+\beta=5$

$\alpha\beta=2 \to \alpha=\frac{2}{\beta}\quad \left\{\beta+\frac{2}{\beta}=5\right.$

$\beta^2-5\beta+2=0 \Rightarrow \beta^2=5\beta+2$

$5\beta^2=25\beta+10$ (1)

$\alpha=5-\beta$ (2)

$\frac{4\alpha+\beta^5}{5\beta^2}=\frac{20-4\beta+\cancel{\beta^5}^{\,\beta(\beta^2)^2}}{\cancel{5\beta^2}\ 25\beta+10}$

$\Rightarrow \beta^2=5\beta+2 \Rightarrow \beta^4=145\beta+54 \Rightarrow =145\beta^2+54\beta$

-9 $x=2,\ y=14 \to 14=4a+2b+4 \to 2a+b=5$

$x=-3 \to y=4 \to 4=9a-3b+4 \to 3a=b$

$a=1,\ b=3,\ c=4$

$f(x)=x^2+3x+4 \to \boxed{x_s=\frac{-3}{2}}$

-10 مماس است پس در یک نقطه قطع می‌کند

$x>0,\ y=x$

$y=2x^2+(m+1)x+m+6$

$x=2x^2+(m)x+m+6=0$

$f(x)=2x^2-3x+2 \to$ مماس $(1,1)$

$\Delta=m^2-8m-48=0 \to m=-4,\ m=12$

$f(x)=2x^2+13x+18 \to$ ~~مماس $(-3,-3)$~~

پس فقط $\boxed{m=4}$