دهم رفتر B
سری ۲۴

۱۹٫۲۵ آفرین

ماریناامین الرعایا

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۱- الف) $y = 2x^2 - 4x + 1$ $\quad min \left| \begin{array}{l} x_s = \frac{-b}{2a} = \frac{+4}{4} = 1 \\ y_s = \frac{-\Delta}{4a} = -1 \end{array} \right.$

ب) $y = -2x^2 + 3x - 5$ $\quad max \left| \begin{array}{l} x_s = \frac{-b}{2a} = \frac{-3}{-4} = +\frac{3}{4} \\ y_s = \frac{-\Delta}{4a} = \frac{+31}{-8} \end{array} \right.$

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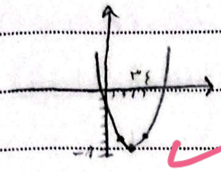
۲- الف) $x^2 - 6x + 1$ $\quad min \left| \begin{array}{l} \frac{-b}{2a} = \frac{+6}{2} = 3 \\ \frac{-\Delta}{4a} = -8 \end{array} \right.$

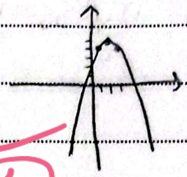
x	y
2	-7
3	-8
4	-7



ب) $y = -x^2 + 4x + 1$

x	y
1	4
2	5
3	4

$x_s = \frac{-b}{2a} = \frac{-4}{-2} = +2$ $\quad max \quad y_s = 5$



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$4x^3 + Kx^2 - 9x - 2 = 0$ $\quad \alpha^2 + \beta^2 = (\alpha+\beta)^2 - 2\alpha\beta = 1 + 4 = 5$, $\alpha^3 + \beta^3 = (\alpha+\beta)^3 - 3\alpha\beta(\alpha+\beta) = 1 + 6 = 7$

$4\alpha^3 + K\alpha^2 - 9\alpha - 2 = 0$

$4\beta^3 + K\beta^2 - 9\beta - 2 = 0$ $\Big\}$ $\underbrace{4\alpha^3 + 4\beta^3}_{28} + \underbrace{K\alpha^2 + K\beta^2}_{5K} \underbrace{- 9\alpha - 9\beta}_{-9} - 4 = 0 \Rightarrow 28 + 5K - 13 = 0 \rightarrow 5K = -15 \rightarrow K = -3$

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$x^2 - 3mx + m = 0$, $2x^2 - mx - m = 0 \xrightarrow{m=1} \frac{c}{a} = \frac{-1}{2}$, $\xrightarrow{m = \frac{1}{9}} \frac{-1}{18} = \frac{c}{a}$

$|\sqrt{\alpha} - \sqrt{\beta}| = 1 \rightarrow (\sqrt{\alpha} - \sqrt{\beta})^2 = 1 \rightarrow \alpha + \beta - 2\sqrt{\alpha\beta} = 1 \rightarrow 3m - 2\sqrt{m} = 1$

$\alpha + \beta = 3m$, $\alpha\beta = m \rightarrow (3m-1)^2 = (2\sqrt{m})^2 \rightarrow 9m^2 - 6m + 1 = 4m \rightarrow 9m^2 - 10m + 1 = 0$

$m = \frac{10 \pm \sqrt{100 - 36}}{18} = \frac{10 \pm 8}{18}$ $\quad m \begin{cases} 1 \\ \frac{1}{9} \end{cases}$ $\quad 2x^2 - mx - m = 0 \rightarrow \frac{c}{a} = \frac{-m}{2}$

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$y = 2x^2 - (m+2)x + m$

$\alpha + \beta = \frac{m+2}{2}$, $\alpha\beta = \frac{m}{2}$

S مثلث : $\frac{1}{2}|\beta - \alpha| \times |m| = \frac{3}{4} \longrightarrow \frac{1}{2} \times \left|\frac{m-2}{2}\right| \times |m| = \frac{3}{4} \longrightarrow |m(m-2)| = 3 \Rightarrow m \begin{cases} 3 \\ -1 \end{cases}$

$|\beta - \alpha| = \sqrt{(\alpha+\beta)^2 - 4\alpha\beta} = \frac{|m-2|}{2}$

$y = x^2 - mx + 1$, $x_s = \frac{m}{2}$ $\quad x \begin{cases} \frac{3}{2} \\ \frac{-1}{2} \end{cases}$

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$y = ax^2 + 3x + a$, $a > 0$

$y_s = \frac{-\Delta}{4a} = \frac{4a^2 - 9}{4a} = \frac{7}{8} \rightarrow 8(4a^2 - 9) = 28a \rightarrow 32a^2 - 28a - 72 = 0 \rightarrow 8a^2 - 7a - 18 = 0$

$\Delta = 49 + 576 = 625 \rightarrow a = \frac{7 \pm 25}{16} \rightarrow a \begin{cases} 2 \; ✓ \\ \frac{-9}{8} \; ✗ \end{cases}$ غ‌ق‌ق

یک مقدار

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$x^2 + (a+1)x + a = 0$, x ضریب $= \frac{-b}{a} \rightarrow m + (m+2) = 2m + 2 = -(a+1) \rightarrow 2m + 2 = -(a+1)$

$c = a = \frac{c}{a}$ $\quad m(m+2) = a \rightarrow m = -\frac{(a+3)}{2}$ $\quad$ ریشه‌ها $m, m+2$ باشد

$-\frac{(a+3)}{2} \times \left(-\frac{(a+3)}{2} + 2\right) = a \rightarrow a^2 + 2a - 3 = 0 \rightarrow a = 3$, $x^2 + 4x + 3 = 0 \rightarrow x \begin{cases} -1 \\ -3 \end{cases}$

$x^2 + (3a+1)x + b = 0 \rightarrow x^2 + 10x + b = 0 \rightarrow b = 4 \times 6 = 24$

$\Rightarrow 24 - 3 = 21$

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۸- $y=-ax^2+ax+2 \longrightarrow \left(\frac{-b-8}{8}=\frac{-a}{16}+\frac{a}{4}+2\right)\times 16$, $\frac{-b}{2a}=\frac{-a}{-2a}=\frac{1}{2}$, $\frac{-\Delta}{4a}=\frac{-a-8}{4}$

$y=2bx^2-bx-1 \longrightarrow \frac{-b}{2a}=\frac{+b}{4b}=\frac{1}{4}$, $\frac{-\Delta}{4a}=\frac{-b^2-8b}{8b}=\frac{-b-8}{8}$, $\frac{-a-8}{4}=\frac{b}{4}-\frac{b}{2}-1=-1$

$$\begin{cases} -2b-16=-a+4a+32 \longrightarrow -2b-3a=48 \longrightarrow -2b-\cancel{3(-4)}^{12}=48 \longrightarrow -2b=36 \longrightarrow b=-18 \\ -a-8=-4 \longrightarrow -a=4 \longrightarrow a=-4 \end{cases}$$

$b-a=-18+4=-14$

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۹- $25\alpha(x-\alpha)(x-\beta)=0 \longrightarrow 25\alpha x^2-25\alpha(\alpha+\beta)x+25\alpha^2\beta=0$

$25\alpha^2\beta=\beta \Rightarrow 25\alpha^2=1 \Rightarrow \alpha=\pm\frac{1}{5}$

$-25\alpha^2-25\alpha\beta=4 \Rightarrow \alpha\beta=\frac{-1}{5} \longrightarrow \beta>\alpha \longrightarrow \alpha=\frac{-1}{5}, \beta=1$

$y=25\alpha x^2+4x+\beta \Rightarrow -5x^2+4x+1$

$$\left.\begin{array}{l} x_s=\frac{-b}{2a}=\frac{-(+)}{-}=+ \\ y_s=\frac{-\Delta}{4a}=-\frac{(+)}{-}=+ \end{array}\right\}$$ رأس ناحیه اول است

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۱۰- $x^2-(a^2+b^2-12)x+a+b-1=0$

$\frac{c}{a}=\frac{a+b-1}{1}=a+b-1=ab$ $\qquad (a+b)^2=a^2+b^2+2ab$

$\frac{-b}{a}=a^2+b^2-12=a+b$ $\qquad (a+b)^2=a+b+12+2a+2b-2$

$(a+b)^2=3a+3b+10 \longrightarrow (a+b)^2=3(a+b)+10$

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$a+b=t$

قابل قبول است $\quad t^2=3t+10 \longrightarrow t^2-3t-10=0$

$t \begin{cases} 5 \ \checkmark \\ -2 \ \times \end{cases} \longleftarrow (t-5)(t+2)=0$

$$\sqrt{\alpha}-\sqrt{\beta}=۱ \xrightarrow{\text{توان }۲} \alpha+\beta-۲\sqrt{\alpha\beta}=۱ \longrightarrow ۳m-۲\sqrt{m}=۱ \quad (\sqrt{m}=t)$$ ۴

$$۳t^۲-۲t-۱=۰ \rightarrow \begin{cases} t=۱ \\ t=\frac{-۱}{۳} \end{cases} \xrightarrow{\sqrt{m}>۰} m=۱$$

$$۲x^۲-mx-m=۰ \longrightarrow ۲x^۲-x-۱=۰ \longrightarrow \frac{c}{a}=\boxed{\frac{-۱}{۲}}$$

$$y=-ax^۲+ax+۲ \longrightarrow S\left(\frac{۱}{۲}, \frac{a}{۴}+۲\right)$$ ۸

$$y=۲bx^۲-bx-۱ \longrightarrow S\left(\frac{۱}{۴}, -\frac{b}{۸}-۱\right)$$

$$۲b\left(\frac{۱}{۴}\right)-b\left(\frac{۱}{۲}\right)-۱=\frac{a}{۴}+۲ \longrightarrow \frac{a}{۴}=-۳ \longrightarrow \boxed{a=-۱۲}$$

$$-a\left(\frac{۱}{۱۶}\right)+a\left(\frac{۱}{۴}\right)+۲=-\frac{b}{۸}-۱ \longrightarrow -\frac{۳}{۴}\cancel{-۳+۲}=-\frac{b}{۸}\cancel{-۱} \longrightarrow \boxed{b=-۶}$$

$$b-a=-۶-(-۱۲)=\boxed{۶}$$