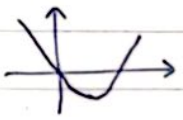
۱) $y = 3x^2 - 2x \rightarrow \frac{-b}{2a} = \frac{1}{3} \rightarrow$ عرض راس $y = \frac{-1}{3}$ $\quad S \left| \begin{matrix} \frac{1}{3} \\ \frac{-1}{3} \end{matrix} \right.$ $\quad \frac{-b \pm \sqrt{\Delta}}{2a}$ ← ۰ و $\frac{2}{3}$

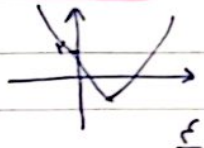


ناحیه سوم

$y = -x^2 + 4x \rightarrow \frac{-b}{2a} = \frac{-4}{-2} = 2$ عرض راس $= 4$ $\quad S \left| \begin{matrix} 2 \\ 4 \end{matrix} \right.$ $\quad \frac{-b \pm \sqrt{\Delta}}{2a}$ ← ۰ و ۴

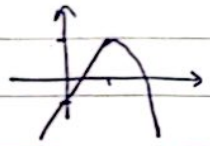
ناحیه دوم

۲) $y = 2x^2 - 5x + 2 \rightarrow \frac{-b}{2a} = \frac{5}{4} \rightarrow$ عرض راس $= \frac{-9}{8}$ $\quad \left| \begin{matrix} \frac{5}{4} \\ \frac{-9}{8} \end{matrix} \right.$



ناحیه ۱ و ۲ و ۴

$y = -x^2 + 4x - 1 \rightarrow \frac{-b}{2a} = 2 \rightarrow$ عرض راس $= 3$ $\quad \left| \begin{matrix} 2 \\ 3 \end{matrix} \right.$ $\quad \frac{-4 \pm \sqrt{12}}{-2}$



ناحیه ۱ و ۳ و ۴

۳) $x^2 - x - 3 = 0$ ← α و β

الف) $\frac{\alpha+\beta}{\alpha-\beta} = \frac{1 \pm \sqrt{1+12}}{2} \rightarrow \frac{1+\sqrt{13}}{2}$ و $\frac{1-\sqrt{13}}{2}$

$\alpha - \beta = \frac{1+\sqrt{13}-1+\sqrt{13}}{2} = \frac{2\sqrt{13}}{2} = \sqrt{13}$

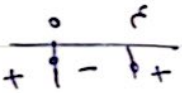
$\rightarrow \frac{1}{\sqrt{13}} = \frac{\sqrt{13}}{13}$

ب) $\alpha^2 + \beta^2 \rightarrow S^2 - 2P \rightarrow 1 - 2(-3) = 7$

ج) $\alpha^3 + \beta^3 \rightarrow S^3 - 3SP = 1 - 3(-3)(1) = 10$

د) $\alpha^3 - \beta^3 \rightarrow \underbrace{(\alpha-\beta)}_{\sqrt{13}}^3 + 3\alpha\beta(\alpha-\beta) = (\sqrt{13})^3 + 3(-3)(\sqrt{13}) = 4\sqrt{13}$

۴) $x^2 - ax + a \rightarrow \Delta < 0 \rightarrow a^2 - 4a < 0 \rightarrow a(a-4) < 0$



$(0, 4)$

۵) $2\alpha^2 + \beta - 4\alpha = 7 \rightarrow \alpha^2 + \beta + \alpha^2 - 4\alpha = 7 \rightarrow 16 + \frac{2}{3}a + \frac{a}{3} \rightarrow a = -9$

$3\alpha^2 - 12\alpha - a = 0 \rightarrow \alpha^2 - 4\alpha = \frac{a}{3}$ ← $\frac{9}{3}$

$3\beta^2 - 12\beta - a = 0$

$3x^2 - 12x + 9 = 0 \rightarrow 3(x^2 - 4x + 3) = 0 \rightarrow \frac{4 \pm \sqrt{4}}{2} \rightarrow 3$ و ۱ ← ریشه بزرگتر

$\frac{-9}{3} = -3$

۶) راس $\begin{vmatrix}5\\3\end{vmatrix}$ عرض هایپربل b = طول راس $= 5 \Rightarrow \frac{7-2a+2a+3}{2} = 5$

ax^2+bx+c $\quad A(9,1)\ B(1,1)$ $\quad a=3$ $\quad \frac{-b}{2a} = 5 \rightarrow b = -10a$

$$\left.\begin{array}{l} 25a+5b+c=3 \rightarrow 25a-50a+c=3 \\ a+b+c=1 \rightarrow a-10a+c=1 \end{array}\right\} \rightarrow -14a = 2 \rightarrow a = \frac{-1}{8}$$

طول $\rightarrow \frac{1}{8}$

۷) $\quad 40\beta^2+20\alpha^2-20\beta=17$ $\quad ax^2-ax-b=0$

$\alpha+\beta = \frac{-b}{a} = 1 \rightarrow \alpha = 1-\beta$

$40\beta^2+20(1-\beta)^2-20\beta=17$

$40\beta^2-40\beta+3=0 \rightarrow 20\beta^2-20\beta+1=0$

$\beta = \frac{20 \pm 8\sqrt{5}}{40} \rightarrow \frac{5+2\sqrt{5}}{10}$ یا $\frac{5-2\sqrt{5}}{10}$

$\alpha = \frac{5-2\sqrt{5}}{10}$ یا $\frac{5+2\sqrt{5}}{10}$

$|\alpha-\beta| = \left|\frac{-2\sqrt{5}}{5}\right| = \frac{2\sqrt{5}}{5}$

۸) $\quad (-5,\beta)\ (1,\beta) \rightarrow$ طول $= -2$ $\quad$ راس $= \begin{vmatrix}-2\\-\frac{1}{2}\end{vmatrix}$ $\quad$ عرض از مبدأ $= \begin{vmatrix}0\\\frac{3}{2}\end{vmatrix}$

$y = a(x+2)^2-\frac{1}{2} \leftarrow \frac{3}{2} = 4a-\frac{1}{2} \leftarrow 4a = \frac{4}{2} \rightarrow a = \frac{1}{2}$

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

$\hookrightarrow x=-5 \rightarrow \frac{1}{2}(-3)^2-\frac{1}{2} \rightarrow \beta = 4$

۹) $\quad \alpha+\beta = -6$ $\quad$ طول راس $= -3$ $\quad (\underbrace{-3+2}_{\alpha}), (\underbrace{-3-2}_{\beta})$

$3(-3+2)^2+2(-3-2)^2 = 12\sqrt{2}+80$ $\quad 5y^2+45-4y = 12\sqrt{2}+80$

$y = -2\sqrt{2}$ $\quad \alpha = -3-2\sqrt{2}$ $\quad \beta = -3+2\sqrt{2}$ $\quad 9-8 = \boxed{1=a}$

۱۰) $\quad \alpha\beta = \frac{1}{36}$ $\quad \sqrt{\frac{1}{\alpha}}+\sqrt{\frac{1}{\beta}} = 5 \rightarrow \underbrace{\frac{1}{\alpha}+\frac{1}{\beta}}_{\frac{\alpha+\beta}{\alpha\beta}} + 2\sqrt{\frac{1}{\alpha\beta}} = 25$

$\frac{\alpha+\beta}{\frac{1}{36}} + 2\sqrt{36} = 25 \xrightarrow{\times \alpha\beta} 36(\alpha+\beta) = 13 \quad (\alpha+\beta) = \frac{13}{36}$

$\frac{m+14}{36} = \frac{13}{36} \rightarrow m+14 = 13 \rightarrow m = -1$

$mx^2+3x+2=0 \rightarrow -x^2+3x+2=0 \rightarrow \frac{c}{a} = -2$