Subject:
Year : Month : Day : ( )

محمد حامی لاهای

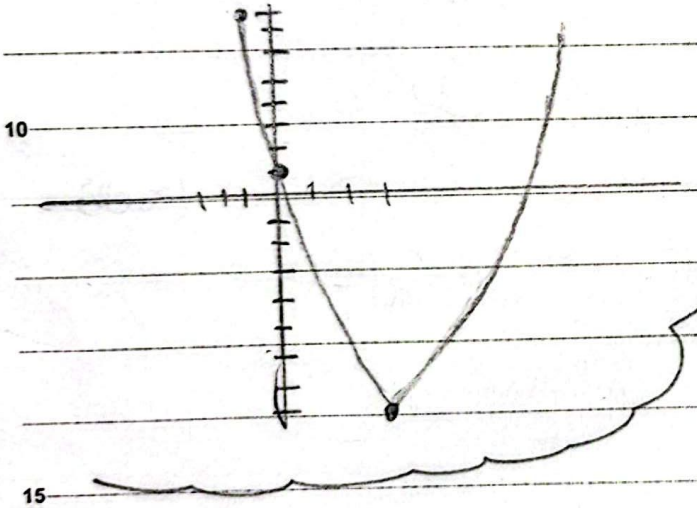
سؤال ۱)

الف) ext → Min $\left|\begin{array}{l}\frac{-b}{2a}=\frac{4}{4}=1\\ 2(1)-4+1=-1\end{array}\right.$

ب) ext → Max $\left|\begin{array}{l}\frac{-b}{2a}=\frac{-3}{-4}=\frac{3}{4}\\ -2(\frac{9}{16})+\frac{9}{4}-x=\frac{-9+18-4x}{8}=\frac{-31}{8}\end{array}\right.$

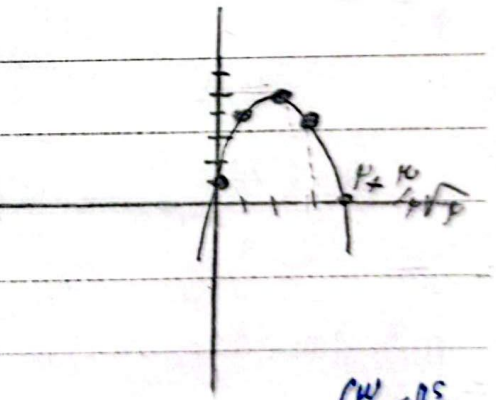
سؤال ۲)

الف) Min $\left|\begin{array}{l}\frac{-b}{2a}=\frac{9}{2}=3\\ 9-18+1=-8\end{array}\right.$ $\left|\begin{array}{l}-1\\ 8\end{array}\right.$ $\left|\begin{array}{l}0\\ 1\end{array}\right.$



ب) Max $\left|\begin{array}{l}\frac{-b}{2a}=2\\ -4+8+1=5\end{array}\right.$

$\left|\begin{array}{l}1\\ 4\end{array}\right.$



سؤال ۳)

$x^2-3x+2=0$ $x^2-x-2=0$

$4x^3+4x^2-9x-2=x^2-x-2 \Rightarrow 4x^3+4x^2-9x-x^2+x=0$

$4x^3+x^2(k-1)-8x=0 \Rightarrow x(4x^2+x(k-1)-8)=0$

$\Rightarrow 4x^2+x(k-1)-8=0 \Rightarrow 4x^2+x(k-1)-8=x^2-x-2$

$3x^2+x(k)-6=0 \Rightarrow 3x^2+x(k)-6=x^2-x-2$

$2x^2+x(k+1)-4=x^2-x-2 \Rightarrow x^2+x(k+1)-2=0 \quad (x^2-x-2)$

$\Delta=0 \Rightarrow (k+1)^2=8 \Rightarrow k=-1$

سؤال ۴) $x^2 - mx + m$ $\quad \alpha+\beta = m$, $\alpha\beta = m$

$(\sqrt{\alpha} - \sqrt{\beta})^2 = 1 \Rightarrow \alpha + \beta - 2\sqrt{\alpha\beta} = 1$

$m - 2\sqrt{m} = 1 \quad \sqrt{m} = t \rightarrow t^2 - 2t - 1 = 0$ ← این $t^2 - 2t - 3 = 0$

$(t-3)(t+1) = 0$

$t = -1$ غ ق ق $\quad$ جذر ق ق $t = 3$ ← $t = \frac{3}{3} = 1$

$\sqrt{m} = 1 \Rightarrow m = 1$ $\quad 3x^2 - mx - m = 0 \Rightarrow 3x^2 - x - 1 = 0$

مجموع ریشه‌ها $= \frac{-b}{a} = \frac{1}{3}$

سؤال ۵) $y = 2x^2 - (m+2)x + m$ $\quad a+b+c = 0$

$x = 1$ یا $x = \frac{c}{a} = \frac{m}{2}$ $\quad \frac{m-2}{2}$

$\frac{m \times (\frac{m}{2} - 1)}{2} = \frac{\frac{m^2 - 2m}{2}}{\frac{2}{1}} = \frac{m^2 - 2m}{4} = 3$

$m^2 - 2m - 3 \Rightarrow m^2 - 2m - 3 = 0 \Rightarrow (m-3)(m+1) = 0$

$m = 3$ یا $m = -1$

$y = ax^2 - mx + 1 \rightarrow x_1 + x_2 = \frac{-b}{a} = 2$

$y = ax^2 - mx + 1 \rightarrow x_1 x_2 = \frac{c}{a} = 1$

سؤال ۶) $\frac{-\Delta}{4a} = \frac{-b^2 - 4ac}{4a} = -\frac{9 - 4a^2}{4a} = \frac{7}{8}$

$-7 + 8a^2 = 7a \Rightarrow -1 + a^2 = a$

$8a^2 - 7a - 1 = 0$

$\Delta = b^2 - 4ac = 49 + 32 = 81$

Subject:
Year : Month : Day : ( )

$a = \frac{-b \pm \sqrt{\Delta}}{2a} = \frac{1 \pm 3a}{10} = \begin{cases} \to 2 & a>0 \\ \to -1/3 & \text{قبول نیست} \end{cases}$

سؤال ۱) $|\alpha - \beta| = \frac{\sqrt{\Delta}}{|a|} = \frac{\sqrt{a^2+2a+1-4a}}{1} = \sqrt{a^2-2a+1} = \sqrt{(a-1)^2}$

$|a-1| \Rightarrow a-1$ مطلق $\Rightarrow a-1 \geq 0 \Rightarrow a \geq 1$

پس مثبت

$a^2-(b+5)a+b = a^2-5a+b=0$

$\alpha' - \beta' = \frac{\sqrt{\Delta}}{|a|} = \frac{\sqrt{100-4b}}{1} = 2 \Rightarrow \sqrt{100-4b} = \sqrt{4} \Rightarrow 100-4b = 4$

$4b = 96 \Rightarrow b = 24$

① $a^2-12a+36 \quad \frac{c}{a} = 36$

② $a^2-5a+24 \quad \frac{c}{a} = 24$ $\Big\rangle 36-24 = 12$

سؤال ۷) $\frac{-a}{2(-a)} = \frac{1}{2} \to \frac{-\Delta}{4a} = \frac{a+8}{4} \to \begin{vmatrix} 1/2 \\ \frac{a+8}{4} \end{vmatrix} \quad \frac{+b}{4b} = \frac{1}{4} \to \frac{-\Delta}{4a} = \frac{-a-8}{8}$

$y = 2ba^2-bx-1 \to \frac{a+8}{4} = 2b(\frac{1}{2})^2 - b(\frac{1}{2})-1 = \frac{a+8}{8} = \frac{b}{2} - \frac{b}{4} - 1$

$a+8 = -8 \Rightarrow a = -16$ $\Big\{ y = -ax^2+ax+2, \frac{-b-1}{8} = -a(\frac{1}{4})^2 + a(\frac{1}{4}) + 2 \Rightarrow$

$2 + \frac{3}{16} - \frac{12}{16}$

$\frac{-b-1}{8} = \frac{-1}{4} \qquad -4b-32 = -8$

$-24 = 4b \Rightarrow b = -6$

$b-a = -6-(-16) = 10$

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Subject:
Year: Month: Day: ( )

سوال ۹)

$\alpha\beta = \frac{\beta}{2\cos\alpha} = \alpha = \frac{1}{2\cos\alpha} \Rightarrow \frac{1-2\cos^2\alpha}{2\cos\alpha} = 0$

$\Rightarrow 1-2\cos^2\alpha = 0 \Rightarrow 2\cos^2\alpha = 1 \Rightarrow \cos^2\alpha = \frac{1}{2} \Rightarrow \cos\alpha = \pm\frac{1}{\sqrt{2}}$

$\alpha+\beta = \frac{-k}{2\cos\alpha} = \textcircled{1}\ \alpha = \frac{1}{2} \Rightarrow \frac{1}{2}+\beta = \frac{-k}{2} \Rightarrow \beta = -\frac{k}{2} - \frac{1}{2}$ چون

$\textcircled{2}\ \alpha = -\frac{1}{2} \Rightarrow -\frac{1}{2}+\beta = \frac{-k}{-2} \Rightarrow \beta = \frac{k+1}{2}$ چون $\beta = 1$

$\beta > \alpha \Rightarrow$ قبول $\alpha = -\frac{1}{2}$ و $\beta = 1$ قابل قبول

10

$y = -2x^2+4x+1$ Max $\left|\begin{array}{l} \frac{-b}{2a} = \frac{-4}{-10} = \frac{4}{10} = 0.4 \\ -2(0.4)^2+4(0.4)+1 = 1.8 \end{array}\right.$

راس سهمی نامنفی قرار دارد

سوال ۱۰)

15

$a+b = a^2+b^2-14$

$ab = a+b-1 \Rightarrow a+b = ab+1$

$-ab+1 = a^2+b^2-14 \qquad a^2+b^2-ab-14$

$(a+b)^2-3ab-ab-14 = 0$

$(a+b)^2-4ab-14 = 0$

$(a+b)^2-4(a+b-1)-14 = 0$

20

$t^2-4t+4-14 = 0 \quad t^2-4t-10 = 0 \quad (t-5)(t+2) = 0$

$t = 5 \quad t = -2$

$a+b = 5$ چون $a+b > 0$