تمرین درس ۳۴

۱) الف) $y=-2x^2-4x+1$

max: $\frac{-b}{2a}=\frac{4}{-4}=-1$

$\frac{-\Delta}{4a}=\frac{16-8}{4\times(-2)}=-1$

ب) $y=-2x^2+3x-5$

min: $\frac{-3}{-4}=\frac{3}{4}$

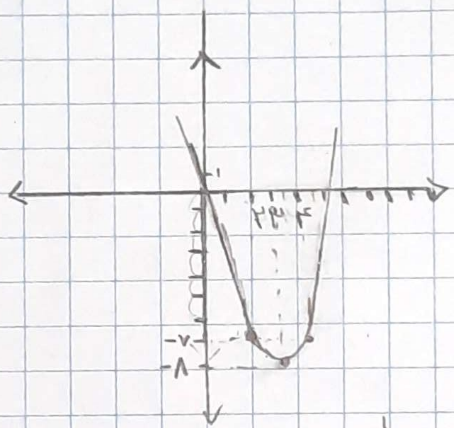
$\frac{9-4\times5\times2}{-8}=\frac{-31}{8}$

۲) الف) $y=x^2-6x+1$

min: 3 ، -8

$(2,-7)$
$(3,-8)$
$(4,-7)$

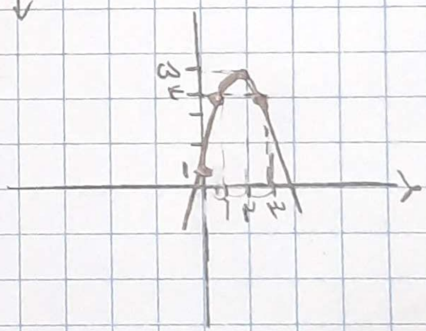
$x=0 \to y=1$
$y=0 \to x$



ب) $y=-x^2+4x+1$

max: 2 ، 5

$(1,4)$
$(2,5)$
$(3,4)$
$(0,1)$



۳) $4x^3+Kx^2-9x-2=0$

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

$\underbrace{\alpha\beta}_{-2}\gamma=\frac{2}{4} \to \gamma=\frac{-1}{4}$

$\gamma=\frac{-1}{4}$

$1-\frac{1}{4}=\frac{-K}{4} \to \frac{3}{4}=\frac{-K}{4}$

$K=-3$

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$x^2 - 3mx + m$

۴)

$\alpha + \beta = \frac{-b}{a} = 3m$

$\alpha\beta = \frac{c}{a} = m$

$|\sqrt{\alpha} - \sqrt{\beta}| = 1 \xrightarrow{\text{توان ۲}} \alpha + \beta - 2\sqrt{\alpha\beta} = 1$

$3m - 2\sqrt{m} = 1$

$m = 1$

$2x^2 - mx - m \rightarrow 2x^2 - x - 1$

$\frac{c}{a} = \frac{-1}{2}$

۵)

$y = 2x^2 - (m+2)x + m = 0 \longrightarrow x = 1, \frac{m}{2}$

$a + b + c = 0 \quad y(0) = m$

$S = \frac{1}{2} | m(\frac{m}{2} - 1)|$

$\rightarrow |m(\frac{m}{2} - 1)| = \frac{3}{2} \rightarrow |m(m-2)| = 3 \rightarrow m = -1 \rightarrow \frac{m}{2} = \frac{-1}{2}$

$m = 3 \rightarrow \frac{3}{2}$

۶)

$\frac{-b}{2a}$, $\frac{-\Delta}{4a}$

$\frac{-\Delta}{4a} = \frac{4\alpha^2 - 9}{4\alpha} = \frac{7}{8}$

$28\alpha = 32\alpha^2 - 72$

$32\alpha^2 - 28\alpha - 72$

$8\alpha^2 - 7\alpha - 18 \rightarrow \alpha^2 - 7\alpha - 144$

$(\alpha - 16)(\alpha + 9)$

$2 \leftarrow \frac{16}{8}$ $\quad \frac{-9}{8}$

ق ق ق $\quad$ ق ق غ

۷)

$\Delta = (\alpha + 1)^2 - 4\alpha$

$x = \frac{\alpha + 1 \pm \sqrt{(\alpha+1)^2 - 4\alpha}}{2} = \frac{\alpha + 1 \pm \sqrt{\alpha^2 + 2\alpha + 1 - 4\alpha}}{2}$

$\frac{\alpha + 1 \pm \sqrt{\alpha^2 - 2\alpha + 1}}{2} = \frac{\alpha + 1 \pm (\alpha - 1)}{2}$

$+ \rightarrow \frac{\alpha + 1 + \alpha - 1}{2} = \frac{2\alpha}{2} = \alpha$

$- \rightarrow \frac{\alpha + 1 - \alpha + 1}{2} = 1$

ریشه ها $\alpha, 1$

$1, 3 - 2\alpha = 3$

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$$x = \frac{-(b+2) \pm \sqrt{(b+2)^2 - 4(b+1)}}{2}$$

$$(b+2)^2 - 4b - 4 = b^2 + 4b + 4 - 4b - 4 = b^2$$

$$x = \frac{-(b+2) \pm |b|}{2}$$

$$-b-2+b \to -2 \to -1$$

$$-b-2-b \to -2-2b$$

[illegible]

$3 \times 1 \leftarrow$ [illegible] $\quad 0 - 3 = -3$

[illegible] $\leftarrow 0$ یا $8 \quad 8 - 3 = 5$

-۸

$$y = -a x^2 + a x + 2$$

$$\frac{-b}{2a} = \frac{-a}{-2a} = \frac{1}{2}$$

$$\frac{-\Delta}{4a} = \frac{a^2 + 8a}{4a} = \frac{a}{4} + 2$$

$$g = 2b x^2 - bx - 1$$

$$x \to \frac{1}{2} \qquad \frac{a}{4} + 2 = \frac{b}{2} - \frac{b}{2} - 1$$

$$y \to \frac{a}{4} + 2 \qquad \to a = -12$$

راس سهمی $\frac{1}{4} = x$

$$\frac{-b}{8} - 1 = y \qquad \frac{-b}{8} - 1 = \frac{-a}{16} + \frac{4a}{16} + 2$$

$$\frac{-b}{8} - 1 = \frac{3a}{16} + 2$$

$$\xleftarrow{a=-12} \frac{-b}{8} = \frac{3a}{16} + 3$$

$$\frac{-b}{8} = \frac{-9}{4} + 3 \to b = -6$$

$$b - a = -6 - (-12) = 6$$

-۹

$$S = \alpha + \beta = \frac{-4}{25a}$$

$$P = \alpha\beta = \frac{b}{25a}$$

$$14\beta = 0 \to P = 0$$

$$S = 25a^2 = -4 \quad \text{[illegible]}$$

$$\beta \neq 0 \quad \frac{\alpha\beta}{\beta} = \frac{\frac{\beta}{25a}}{\beta} \to \alpha = \frac{1}{25a}$$

$$\alpha = \pm \frac{1}{5}$$

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if $\frac{+1}{5} = \alpha \to \frac{1}{5} + \beta = \frac{4}{2\cdot5\times\frac{1}{5}} = -\frac{4}{5}$ ✗

$\beta > \alpha \quad b = -1$

if $\frac{-1}{5} = \alpha \quad \frac{-1}{5} + \beta = \frac{-4}{2\cdot5\times\frac{-1}{5}} = \frac{-4}{-5} = \frac{4}{5}$

$\beta = 1 \quad \beta > \alpha$ ✓

$\alpha = \frac{-1}{5} \ , \beta = 1$ [illegible]

$y = 25\alpha x^2 + 4x + \beta = 25 \times \frac{-1}{5} x^2 + 4x + 1$

$y = -5x^2 + 4x + 1$

$x = \frac{-4}{2\times(-5)} = \frac{2}{5}$

$y = -5 \times \frac{4}{25} + 4 \times \frac{2}{5} + 1 = \frac{9}{5}$

$x = \frac{2}{5} > 0$, $y = \frac{9}{5} > 0$ } → راس در ناحیه اول

۱۵)

$x^2 - (a^2 + b^2 - 12)x + (a + b - 1) = 0$

$S = a^2 + b^2 - 12 = a + b$

$P = a + b - 1 = ab$

$a^2 + b^2 = (a+b)^2 - 2ab \to \underbrace{(a+b)^2}_{y^2} - 2(\underbrace{a+b}_{y} - 1) - 12 = \underbrace{a+b}_{y}$

$y^2 - 3y - 10 = 0 \to (y-5)(y+2) = 0$

$a + b = 5 \to$ ✓

$a + b = -2 \to$ غ ق ق

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