به نام او

۱) $a>0 \rightarrow Min$

الف) $y = 2x^2 - 4x + 1$

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

$y = 2(1)^2 - 4\times 1 + 1$

$y = 2 - 4 + 1$

$y = -1$

ext	1	-1
		-1

ب) $y = -2x^2 + 3x - 5$

$a<0 \rightarrow max$

$\frac{-b}{2a} = \frac{-3}{-4} = \frac{3}{4}$

$y = -2\left(\frac{3}{4}\right)^2 + 3\times\frac{3}{4} - 5$

$-2\times\frac{9}{16} + \frac{9}{4} - 5$

$-\frac{9}{8} + \frac{18}{8} - \frac{40}{8} = \frac{-31}{8}$

$-\Delta = -(9 - 4\times -2\times -5) = -31$

$4a = -8 \rightarrow = \frac{-31}{8}$

ext	$\frac{3}{4}$	$\frac{-31}{8}$

۲) $y = x^2 - 6x + 1$

$\frac{-b}{2a} = \frac{6}{2} = 3$

$y = 9 - 18 + 1$

$y = -8$

$a>0 \cup Min$

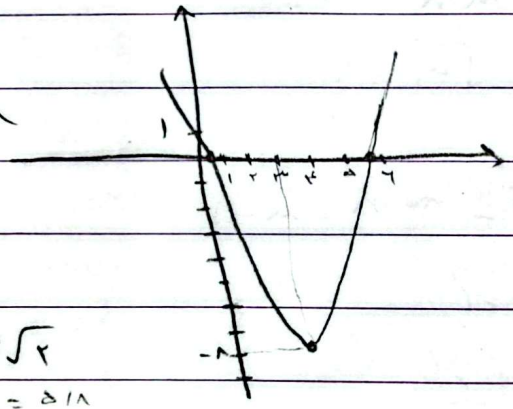
$\Delta = 36 - 4\times 1\times 1 = 32$

$x = \frac{6 \pm \sqrt{32}}{2} \Rightarrow 3 \pm 2\sqrt{2} \simeq$

$3 + 2/8 = 5/8$

$3 - 2/8 = 0/2$

ext	3	-8



ب) $y = -x^2 + 4x + 1$

$a<0 \rightarrow max$

$\frac{-b}{2a} = \frac{-4}{-2} = 2$

$y = -4 + 8 + 1 = 5$

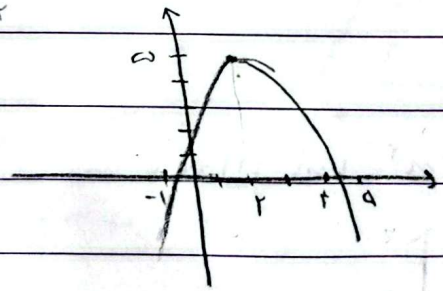
$\Delta = 16 - 4\times -1 = 20$

$\frac{-4 \pm \sqrt{20}}{-2} = \frac{-2 \pm \sqrt{5}}{-1}$

$2 + \sqrt{5} = 4/2$

$2 - \sqrt{5} = -0/2$

ext	2	5



sam

۳) $2x^3 + kx^2 - 9x - 2 = 0$ → مضاف‌الاعداد

$\alpha\beta = -2$ → $\alpha + \beta = 1$ → بیشترین مقدار ④

$k = ?$

$a(x-\alpha)(x-\beta)(x-g)$

$(x^2 - (\alpha+\beta)x + \alpha\beta)(x-g)$

$x^3 - (\alpha+\beta)x^2 + \alpha\beta x - gx^2 + g(\alpha+\beta)x - g\alpha\beta$

$a(x^3 - (\alpha+\beta+g)x^2 + (\alpha\beta + g\alpha + g\beta)x - g\alpha\beta)$

$a = 2$

$\frac{-k}{2} = 1 + g$ $\quad \frac{-k}{2} = 1 - \frac{1}{2}$

$\frac{2}{2} = \frac{1}{2} = -2g$ $\quad \frac{-k}{2} = \frac{3}{2}$

$g = -\frac{1}{2}$ $\quad \boxed{k = -3}$

۴) $x^2 - 2mx + m = 0$

$\alpha + \beta = \frac{2m}{1} = 2m$ $\quad \alpha\beta = m$

$\sqrt{\beta} - \sqrt{\alpha} = 1$ $\quad \beta + \alpha - 2\sqrt{\alpha\beta} = 1$ $\quad 2m - 2\sqrt{m} = 1$ $\xrightarrow{\frac{1}{2}}$ $\frac{1}{2} - \frac{2}{2} = 1$

$2m - 1 = 2\sqrt{m}$ $\quad -\frac{1}{2} \neq 1$

$4m^2 + 1 - 4m = 4m$

$4m^2 - 12m + 1 = 0$

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

$(m-1)(m-2) = 0$

$m = 1$ ✓ $\quad m = 2$ ✗

$2x^2 - mx - m = 0$

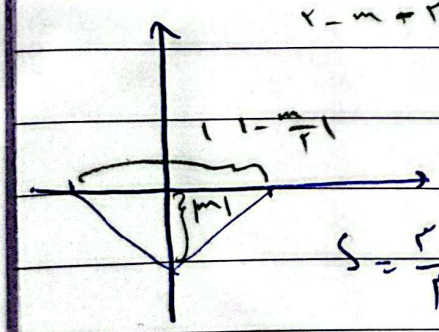
$\rho = ?$ $\quad \frac{-m}{2} = -\frac{1}{2}$

$2x^2 - 2x - 1 = 0$

$\boxed{\rho = \frac{-1}{2}}$

۵) $y = 2x^2 - (m+2)x + m$ ← عرض از مبدأ

$2 - m + 2 + m = 0$ → یکی از رئوس‌ها ۱ و دیگری $\frac{m}{2}$



$S = \frac{3}{4}$ $\quad \left|\frac{2-m}{2}\right| \times |m| \times \frac{1}{2} = \frac{3}{4}$

$|2m - m^2| = 3$ $\quad 2m - m^2 = 3$

$m^2 - 2m = 3$ $\quad m^2 - 2m - 3 = 0$

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

$y = x^2 - mx + 1$ $\quad -\frac{b}{2a} = \frac{m}{2} = ?$ $\quad \frac{3}{2}$ $\quad -1$

بیشتر مقدار

$\frac{3}{2}$ و $\frac{-1}{2}$

s.a.m

سارنا هندیاری

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$a>0$

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

$\min = \frac{V}{8}$ $\quad \frac{-b}{2a} = \frac{-2}{2a}$

$\frac{-\Delta}{4a} = \frac{V}{8}$

$a \times \frac{9}{4a^2} + 2 \times \frac{-2}{2a} + a = y_S$

$\frac{9}{4a} - \frac{9}{2a} + a = y_S$

$\frac{9 - 18 + 4a^2}{4a}$ $\quad \frac{4a^2 - 9}{4a} = y_S = \frac{V}{8}$

$32a^2 - 72 = 32a$

$8a^2 - 72 = 32a$

$8a^2 - 72a - 72 = 0$

$a^2 - 9a - 9 = 0$

$(a-12)(a+9) = 0$

$a > 0 \rightarrow a = 12$ غ ق ق

$a = 12 + 1 = 13$

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$x^2 - (a+1)x + a = 0 \rightarrow$ دوستانه

$S = a+1$ $\quad a+1 = 2\alpha + 2$

$a - 1 = 2\alpha$

$P = a$ $\quad \alpha^2 + \alpha - 1 = \alpha$ $\quad \alpha^2 = 1$

$\alpha = \pm 1 \rightarrow \alpha = 1$

$\alpha, \alpha+2$ $\quad 1, 3$

$S = 2\alpha + 2$

$P = \alpha^2 + 2\alpha$ $\quad 1 + 2 = 3 = P$

$x^2 - (2a+1)x + b = 0 \rightarrow$ زوج مثالی

$S = 2a + 1$ $\quad S = 10$

$P = b$ $\quad 10 = 4\beta + 2$

$b = 24$ $\quad \beta = 2$

$2\beta, 2\beta + 2$

$4\beta + 2 = S$

$4\beta^2 + 4\beta = P$

$14 + 8 = P$

22

$24 - 3 = 21$

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$y = -ax^2 + ax + 2$ $\quad y = 2bx^2 - bx - 1$ $\quad \frac{b}{4b} = \frac{1}{4}$

$-ax^2 + ax + 2 = 2bx^2 - bx - 1$

$\frac{-\alpha}{-2a} = \frac{1}{2}$ $\quad 0 = (2b+a)x^2 - (a+b)x - 3$

$\frac{2b+a}{4} - \frac{(a+b)}{2} - 3 = 0$

$\frac{b}{2} + \frac{a}{4} - \frac{a}{2} - \frac{b}{2} - 3 = 0$

$b - a = -4 + 12 = 4$ $\quad \frac{-a}{4} = +3$ $\quad a = -12$

$\frac{2b+a}{14} - \frac{(a+b)}{4} - 3 = 0$

$\frac{b}{8} + \frac{a}{14} - \frac{a}{4} - \frac{b}{4} - 3 = 0$

$\frac{-b}{8} - \frac{3a}{14} - 3 = 0$ $\quad \frac{-b}{8} + \frac{34}{14} - 3 = 0$

$b = -4$

$\frac{b}{8} = \frac{-12}{14}$

s.a.m

۹) $y = 25\alpha x^2 + 4x + \beta \qquad \beta > \alpha$

$S = \frac{-4}{25\alpha} \qquad P = \frac{\beta}{25\alpha} \qquad \alpha\beta \neq 0$

این حالت رد میشود

$\frac{1}{25\alpha} = \alpha$

$\frac{1}{25} = \alpha^2$

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

$\beta > \alpha$ ①

$\alpha + \beta = \frac{-4}{5} \qquad \frac{1}{5} + \beta = \frac{-4}{5} \qquad \beta = -1$

$-1 > \frac{1}{5}$ ضد فرض

② $\alpha + \beta = \frac{12}{5} \rightarrow \beta = 1 \qquad 1 > \frac{-1}{5}$ ✓✓

$\beta = 1 \quad \alpha = \frac{-1}{5}$

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

$x_S = \frac{-4}{-10} = 0/4 \qquad y_S = -5 \times \frac{16}{100} + 4 \times \frac{4}{10} + 1$

$\frac{-16}{20} + \frac{32}{20} + \frac{20}{20} = \frac{36}{20} = \frac{9}{5}$

در ناحیه اول قرار دارد

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

$a+b = ? \qquad S = a^2+b^2-12 = ?$

$P = a+b-1 \Leftarrow ab$

$a+b = ab+1$

$S = P+1$

$S-1 = P$

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

$S^2 - 2P - 12 = ?S$

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

$S^2 - 3S - 10 = 0$

$(S-5)(S+2) = 0$

$S = 5 \qquad S = -2$

$a+b = 5$ ← مجموع باید عدد طبیعی باشد