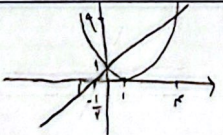
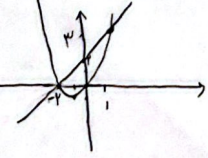


$y_{max} = \frac{-\Delta}{\epsilon a} \pm \frac{\epsilon ac - b^2}{\epsilon a} \pm \sqrt{\epsilon ac - b^2} \rightarrow \epsilon ac - b^2 \geq 0 \Rightarrow -12 - b^2 \geq 0$ $b^2 \leq 14, b = \sqrt{14} \leq 4, -4$	۱
الف) تابع صفر ندارد. $t^2 + 2t + 3 \rightarrow \Delta < 0$, $x^2 = t$ ب) $t - x^2 \leq 0 \rightarrow t - 2t - 1 \leq 0 \rightarrow \Delta \leq 4 + 4 = 8, t = \frac{2 \pm \sqrt{8}}{2} \Rightarrow t = 1, -3$ $t - x^2 \leq 0 \rightarrow x^2 \leq 1 \Rightarrow x = \pm 1$, $t - x^2 = -3 \Rightarrow x^2 = 3, x = \pm \sqrt{3}, x_1 = -\sqrt{3}$	۲
$x_2 = x_1 + 2 \rightarrow S = x_1 + x_1 + 2 = 2x_1 + 2 \rightarrow S = \frac{-b}{a} \pm \frac{\sqrt{b^2 - 4ac}}{a} \Rightarrow 2x_1 + 2 = \frac{-4}{2} \pm \frac{\sqrt{16 - 4(2)(2)}}{2}$ $p = \frac{c}{a} \pm \frac{m}{a} \pm \sqrt{\frac{m^2}{a^2}} \Rightarrow \frac{m}{a} \pm \sqrt{\frac{m^2}{a^2}}$ $\epsilon m^2 - 14m + 12 = 0$ $\Delta > 0$	۳
$\beta \leq 2\alpha - 4 \rightarrow S = \alpha + 2\alpha - 4 = \frac{-b}{a} \pm \sqrt{\frac{b^2 - 4ac}{a^2}} \Rightarrow 3\alpha = 4, \alpha = \frac{4}{3} \rightarrow \beta \leq 2(\frac{4}{3}) - 4 = 0$ $p = \frac{c}{a} \pm \frac{m-1}{a} \Rightarrow m = 1$ $\epsilon m^2 - 4m = 0$ $\Delta > 0$	۴
$x_2 = \frac{1}{x_1} \rightarrow \frac{c}{a} \pm 1, \frac{m^2}{-m} \pm 1 \rightarrow m^2 - m = 0, m^2 + m - 1 = 0, \Delta = 1 + 4 = 5, m = \frac{-1 \pm \sqrt{5}}{2} \rightarrow m = -\frac{1}{2}, 1$ if $m = -\frac{1}{2} \rightarrow 2x^2 + 4x + 1 = 0, \Delta = 16 - 4 = 12, x = \frac{-4 \pm \sqrt{12}}{2} = -2 \pm \sqrt{3} \Rightarrow x = -2 + \sqrt{3} \times$ if $m = 1 \rightarrow -x^2 + 4x - 1 = 0, \Delta = 16 - 4 = 12, x = \frac{4 \pm \sqrt{12}}{2} = 2 \pm \sqrt{3}, x_1 = \frac{2 + \sqrt{3}}{2}, x_2 = \frac{2 - \sqrt{3}}{2} \checkmark$	۵

$\alpha \leq \frac{K}{\beta^2} \rightarrow \beta \leq \beta \times \frac{K}{\beta^2} = \frac{K}{\beta} \cdot \beta \Rightarrow \beta \leq \frac{K}{\beta}, \alpha \leq \frac{K}{\beta} \leq \frac{9}{\beta}$ $S \leq \alpha + \beta \leq \frac{9}{\beta} + \frac{K}{\beta} = \frac{4V+14}{14} \leq \frac{K}{14} \Rightarrow m = + \frac{K}{14}$ $2x^2 - \frac{Kx}{14} + 1 \rightarrow \Delta > 0 \checkmark$	1, 2, 3
$x_2 = 2x_1$ $S \leq 2x_1 + x_1 = 3x_1 = \frac{-b}{a}, \quad (x_1, x_2) \Rightarrow x_1 = 1, x_2 = 2$ $P \leq \frac{m}{1} \cdot \beta \Rightarrow m = \beta$ $2x^2 - Kx + 1 \rightarrow \Delta > 0 \checkmark$	1, 2, 3
$x^2 - Vx + 1 = 0 \rightarrow \alpha \beta = 1, \alpha + \beta = V \rightarrow \alpha = \frac{V}{\beta} \rightarrow \frac{1}{\alpha} = \frac{\beta}{V}, \frac{1}{\alpha^2} = \frac{\beta^2}{V^2} \Rightarrow \frac{1}{\alpha^2} = \beta^2$ $\frac{1}{\alpha^2} + \alpha^2 = \beta^2 + \alpha^2 = S^2 - 4 \Rightarrow P \leq V^2 - 4(V)(1) = 4 - 4 = 0$	5
$h(t) = -\frac{1}{2} t^2 + \omega_0 t \rightarrow h_{max}, t_{max} = \frac{-b}{2a} = \frac{-\omega_0}{-1} = \omega_0, h_{max} = -\frac{1}{2}(\omega_0)^2 + \omega_0(\omega_0) = \frac{1}{2}\omega_0^2$ $h(t) = 0 \rightarrow -\frac{1}{2} t^2 + \omega_0 t = 0, t(-\frac{1}{2} t + \omega_0) = 0 \Rightarrow t = \omega_0$	5
الف) $(x-1)^2 = 2x+1 \rightarrow$  $\Rightarrow x = 0, 2$ ب) $x^2 + 2x = x+1 \rightarrow$  $\Rightarrow x = -2, 1$ $x+2 > 0 \rightarrow x^2 + 2x = x+2$ $(x+2)(x-1) \leq 0 \Rightarrow x = -2, 1 \checkmark$ $x+2 < 0 \rightarrow x^2 + 2x = -x-2 \rightarrow x^2 + 3x + 2 = 0$ $(x+1)(x+2) \leq 0$ $x = -1, -2 \rightarrow x = -1 < -2 \checkmark$ $x = -2 < -2 \checkmark$	5