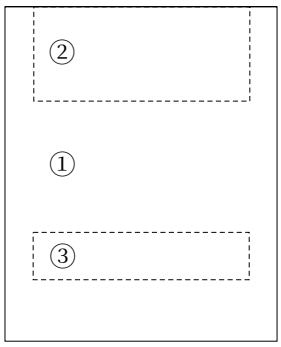
<9.6~9.7절>

9.34 $A = A_1 - A_2 - A_3$

$= (100\ \text{mm})(120\ \text{mm}) - (80\ \text{mm})(40\ \text{mm}) - (80\ \text{mm})(20\ \text{mm})$

$= (12{,}000 - 3{,}200 - 1{,}600)\ \text{mm}^2 = 7{,}200\ \text{mm}^2$



$I_{y1} = \frac{1}{12}(120\ \text{mm})(100\ \text{mm})^3 = 10\times10^6\ \text{mm}^4$

$I_{y2} = \frac{1}{12}(40\ \text{mm})(80\ \text{mm})^3 = 1.7067\times10^6\ \text{mm}^4$

$I_{y3} = \frac{1}{12}(20\ \text{mm})(80\ \text{mm})^3 = 0.8533\times10^6\ \text{mm}^4$

$I_y = I_{y1} - I_{y2} - I_{y3}$

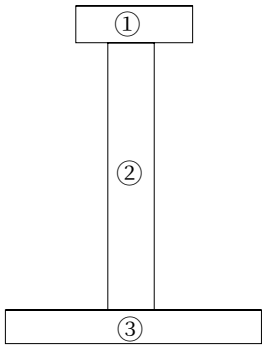
$= (10 - 1.7067 - 0.8533)\times10^6\ \text{mm}^4 = 7.44\times10^6\ \text{mm}^4$

$k_y = \sqrt{\frac{I_y}{A}} = \sqrt{\frac{7.44\times10^6\ \text{mm}^4}{7{,}200\ \text{mm}^2}} = 32.1\ \text{mm}$

9.33 $A = A_1 + A_2 + A_3$

$= (30\ \text{mm})(7.5\ \text{mm}) + (10\ \text{mm})(60\ \text{mm}) + (60\ \text{mm})(7.5\ \text{mm})$

$= (225 + 600 + 450)\ \text{mm}^2 = 1{,}275\ \text{mm}^2$



$I_{y1} = \frac{1}{12}(7.5\ \text{mm})(30\ \text{mm})^3 = 16{,}875\ \text{mm}^4$

$I_{y2} = \frac{1}{12}(60\ \text{mm})(10\ \text{mm})^3 = 5{,}000\ \text{mm}^4$

$I_{y3} = \frac{1}{12}(7.5\ \text{mm})(60\ \text{mm})^3 = 135{,}000\ \text{mm}^4$

$I_y = I_{y1} + I_{y2} + I_{y3}$

$= (16{,}875 + 5{,}000 + 135{,}000)\ \text{mm}^4 = 156{,}875\ \text{mm}^4 \Rightarrow I_y = 1.569\times10^5\ \text{mm}^4$

$k_y = \sqrt{\frac{I_y}{A}} = \sqrt{\frac{156{,}875\ \text{mm}^4}{1{,}275\ \text{mm}^2}} = 11.09\ \text{mm}$