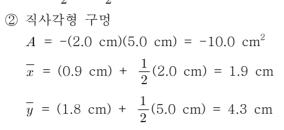
9.43 Centroid

① 직사각판
$$a = 0.9 + 2.0 + 2.1$$
 cm = 5.0 cm $b = 1.8 + 5.0 + 1.2$ cm = 8.0 cm $A = (5.0 \text{ cm})(8.0 \text{ cm}) = 40.0 \text{ cm}^2$ $\overline{x} = \frac{1}{2}a = \frac{1}{2}(5.0 \text{ cm}) = 2.5 \text{ cm}$ $\overline{y} = \frac{1}{2}b = \frac{1}{2}(8.0 \text{ cm}) = 4.0 \text{ cm}$



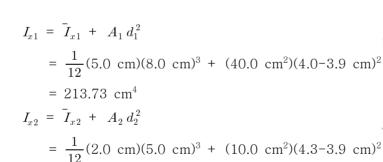
$$\Sigma A = (40.0 \text{ cm}^2) + (-10.0 \text{ cm}^2) = 30.0 \text{ cm}^2$$

$$\Sigma(\overline{x}A) = (2.5 \text{ cm})(40.0 \text{ cm}^2) + (1.9 \text{ cm})(-10.0 \text{ cm}^2) = 81.0 \text{ cm}^3$$

 $\Sigma(\overline{y}A) = (4.0 \text{ cm})(40.0 \text{ cm}^2) + (4.3 \text{ cm})(-10.0 \text{ cm}^2) = 117.0 \text{ cm}^3$

$$\overline{X} = \frac{\Sigma(\overline{x}A)}{\Sigma A} = \frac{81.0 \text{ cm}^3}{30.0 \text{ cm}^2} = 2.70 \text{ cm}$$

$$\overline{Y} = \frac{\Sigma(\overline{y}A)}{\Sigma A} = \frac{117.0 \text{ cm}^3}{30.0 \text{ cm}^2} = 3.90 \text{ cm}$$



$$I_x = I_{x1} - I_{x2}$$

= (213.73 cm⁴) - (22.43 cm⁴) = 191.3 cm⁴

 $= 22.43 \text{ cm}^4$



$$I_{y2} = I_{y2} + A_2 d_2^2 = \frac{1}{12} (2.0 \text{ cm})^3 (5.0 \text{ cm}) + (10.0 \text{ cm}^2)(2.7 - 1.9 \text{ cm})^2 = 9.73 \text{ cm}^4$$

 $I_y = I_{y1} - I_{y2}$
= $(84.93 \text{ cm}^4) - (9.73 \text{ cm}^4) = 75.2 \text{ cm}^4$

