

[9.1절]

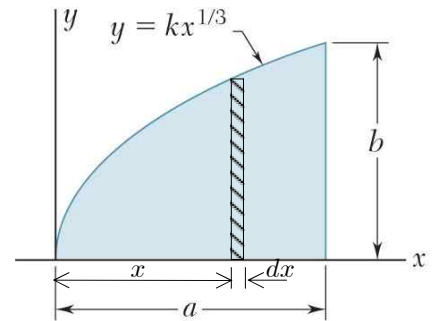
$$9.2\&6 \quad y = k x^{1/3}, \quad (a, b) \Rightarrow b = k a^{1/3}$$

$$\Rightarrow k = \frac{b}{a^{1/3}}, \quad y = \frac{b}{a^{1/3}} x^{1/3}$$

$$dA = y dx = \frac{b}{a^{1/3}} x^{1/3} dx$$

$$(\text{문제 외}) \quad A = \int dA = \int_0^a \frac{b}{a^{1/3}} x^{1/3} dx$$

$$= \frac{b}{a^{1/3}} \left[ \frac{3}{4} x^{4/3} \right]_0^a = \frac{b}{a^{1/3}} \left[ \frac{3}{4} (a^{4/3} - 0) \right] = \frac{3}{4} ab$$



$$9.2 \quad dI_y = x^2 dA = x^2 \frac{b}{a^{1/3}} x^{1/3} dx = \frac{b}{a^{1/3}} x^{7/3} dx$$

$$I_y = \int dI_y = \int_0^a \frac{b}{a^{1/3}} x^{7/3} dx = \frac{b}{a^{1/3}} \left[ \frac{3}{10} x^{10/3} \right]_0^a = \frac{b}{a^{1/3}} \left[ \frac{3}{10} (a^{10/3} - 0) \right] = \frac{3}{10} a^3 b$$

$$\Rightarrow I_y = 0.300 a^3 b$$

$$(\text{문제 외}) \quad k_y^2 = \frac{I_y}{A} = \frac{\frac{3}{10} a^3 b}{\frac{3}{4} ab} = \frac{2}{5} a^2 \Rightarrow k_y = \sqrt{\frac{2}{5} a^2} = 0.632 a$$

$$9.6 \quad dI_x = \frac{1}{3} y^3 dx$$

$$I_x = \int dI_x = \int_0^a \frac{1}{3} y^3 dx = \frac{1}{3} \int_0^a \frac{b^3}{a} x dx = \frac{1}{3} \frac{b^3}{a} \left[ \frac{1}{2} x^2 \right]_0^a = \frac{1}{6} ab^3$$

$$\Rightarrow I_x = 0.0667 ab^3$$

$$(\text{문제 외}) \quad k_x^2 = \frac{I_x}{A} = \frac{\frac{1}{6} ab^3}{\frac{3}{4} ab} = \frac{2}{9} b^2 \Rightarrow k_x = \sqrt{\frac{2}{9} b^2} = 0.471 b$$