

[9.1절]

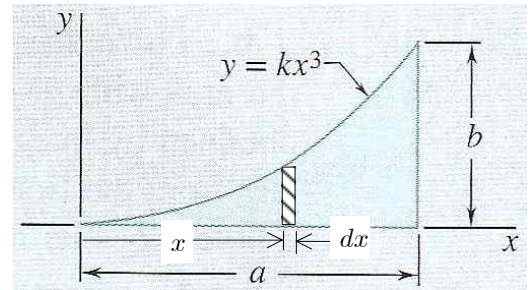
$$9.4\&8 \quad y = kx^3, \quad (a, b) \Rightarrow b = ka^3$$

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

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

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

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



$$9.4 \quad dI_y = x^2 dA = x^2 y dx = x^2 \frac{b}{a^3} x^3 dx = \frac{b}{a^3} x^5 dx$$

$$I_y = \int dI_y = \int_0^a \frac{b}{a^3} x^5 dx = \frac{b}{a^3} \left[\frac{1}{6} x^6 \right]_0^a = \frac{b}{a^3} \left[\frac{1}{6} (a^6 - 0) \right] = \frac{1}{6} a^3 b$$

$$\Rightarrow I_y = 0.1667 a^3 b$$

$$(\text{문제 외}) \quad k_y^2 = \frac{I_y}{A} = \frac{\frac{1}{6} a^3 b}{\frac{1}{4} ab} = \frac{2}{3} a^2 \Rightarrow k_y = \sqrt{\frac{2}{3} a^2} = 0.816 a$$

$$9.8 \quad dI_x = \frac{1}{3} y^3 dx$$

$$I_x = \int dI_x = \int_0^a \frac{1}{3} y^3 dx = \frac{1}{3} \int_0^a \frac{b^3}{a^9} x^9 dx = \frac{1}{3} \frac{b^3}{a^9} \left[\frac{1}{10} x^{10} \right]_0^a = \frac{1}{30} ab^3$$

$$\Rightarrow I_x = 0.0333 ab^3$$

$$(\text{문제 외}) \quad k_x^2 = \frac{I_x}{A} = \frac{\frac{1}{30} ab^3}{\frac{1}{4} ab} = \frac{2}{15} b^2 \Rightarrow k_x = \sqrt{\frac{2}{15} b^2} = 0.365 b$$