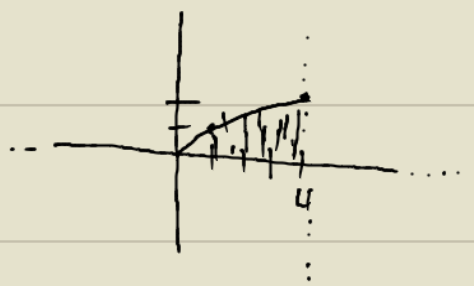


3.  $y = \sqrt{x}$ ,  $y = 0$ ,  $x = 4$ ,  $\rho = Ky$



$$m = \int_{x=0}^4 \int_{y=0}^{\sqrt{x}} (Ky) dy dx$$

$$m = K \int_{x=0}^4 \left[ \frac{1}{2} y^2 \right]_{y=0}^{\sqrt{x}} dx$$

$$m = \frac{1}{2} K \int_{x=0}^4 [(\sqrt{x})^2 - (0)^2] dx$$

$$m = \frac{1}{2} K \int_{x=0}^4 x dx$$

$$m = \frac{1}{2} K \left[ \frac{1}{2} x^2 \right]_{x=0}^{x=4}$$

$$m = \frac{1}{2} K \cdot \frac{1}{2} [4^2 - 0^2]$$

$$= \frac{1}{4} K \cdot 16$$

$$m = 4K$$

$$M_x = \int_{x=0}^4 \int_{y=0}^{\sqrt{x}} y(Ky) dy dx$$

$$M_x = K \int_{x=0}^4 \int_{y=0}^{\sqrt{x}} y^2 dy dx$$

$$M_x = K \int_{x=0}^4 \left[ \frac{1}{3} y^3 \right]_{y=0}^{\sqrt{x}} dx$$

$$M_x = \frac{1}{3} K \int_{x=0}^4 [(\sqrt{x})^3 - (0)^3] dx$$

$$M_x = \frac{1}{3} K \int_{x=0}^4 (x^{\frac{3}{2}}) dx$$

$$M_x = \frac{1}{3} K \int_{x=0}^4 x^{\frac{3}{2}} dx$$

$$M_x = \frac{1}{3} K \left[ \frac{2}{5} x^{\frac{5}{2}} \right]_{x=0}^{x=4}$$

$$M_x = \frac{1}{3} \cdot \frac{2}{5} K \left[ 4^{\frac{5}{2}} - 0^{\frac{5}{2}} \right]$$

$$M_x = \frac{2}{15} K \cdot (4^{\frac{5}{2}})^5$$

$$M_x = \frac{2}{15} K \cdot 32$$

$$M_x = \frac{64}{15} K$$

$$M_y = \int_{x=0}^4 \int_{y=0}^{\sqrt{x}} x(Ky) dy dx$$

$$M_y = K \int_{x=0}^4 \left[ \frac{1}{2} x y^2 \right]_{y=0}^{\sqrt{x}} dx$$

$$M_y = \frac{1}{2} K \int_{x=0}^4 x [y^2]_{y=0}^{\sqrt{x}} dx$$

$$M_y = \frac{1}{2} K \int_{x=0}^4 x [\sqrt{x}^2 - 0^2] dx$$

$$M_y = \frac{1}{2} K \int_{x=0}^4 x^2 dx$$

$$M_y = \frac{1}{2} K \left[ \frac{1}{3} x^3 \right]_{x=0}^{x=4}$$

$$M_y = \frac{1}{2} \cdot \frac{1}{3} K [4^3 - 0^3]$$

$$= \frac{1}{6} K \cdot 64$$

$$= \frac{64}{6} K$$

$$M_y = \frac{32}{3} K$$

$$(\bar{x}, \bar{y}) = \left( \frac{M_y}{m}, \frac{M_x}{m} \right)$$

$$= \left( \frac{\frac{32}{3} K}{4K}, \frac{\frac{64}{15} K}{4K} \right)$$

$$= \left( \frac{8}{3}, \frac{16}{15} \right)$$