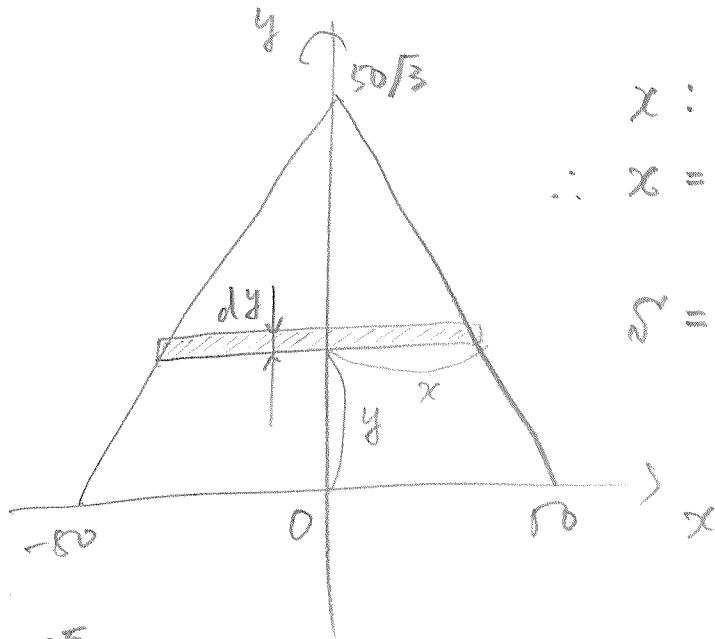


[課題 - 20160518 HW]

厚さ 10mm, 一辺の長さが 100mm の正三角形板がある。  
 積分計算により重心を求めよ。



$$x : (50\sqrt{3} - y) = 1 : \sqrt{3}$$

$$\therefore x = \frac{50\sqrt{3} - y}{\sqrt{3}} = 50 - \frac{1}{\sqrt{3}}y$$

$$S = \frac{1}{2} \times 100 \times 100 \times \sin 60^\circ = 2500\sqrt{3}$$

$$\int_0^{50\sqrt{3}} 2y \left(50 - \frac{1}{\sqrt{3}}y\right) dy = y_G S$$

$$\begin{aligned} \int_0^{50\sqrt{3}} 2y \left(50 - \frac{1}{\sqrt{3}}y\right) dy &= 2 \left[ -\frac{\sqrt{3}}{9}y^3 + 25y^2 \right]_0^{50\sqrt{3}} \\ &= -50^3 + 25 \times 2500 \times 3 \\ &= 2500(55 - 50) \times 2 \\ &= 2500 \times 25 \times 2 \end{aligned}$$

$$\therefore y_G S = 2500 \times 25 \times 2$$

$$\therefore y_G = \frac{2500 \times 25 \times 2}{2500\sqrt{3}} = \frac{25}{\sqrt{3}} = \frac{1}{3} \times \frac{50}{\sqrt{3}}$$