# Self-exercise - SRU05
# Response to questions

Tuan Vo

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## 1 Hint for A1-HA05

**Example 1.** *Given the set* $\mathcal{M} \in \mathbb{R}^2$ *bounded by three points* $A$*,* $B$*, and* $C$*, as shown in Figure 1.*

1. *Examine the integral of a function* $f(x, y)$ *over set* $\mathcal{M}$*.*
2. *Compute the area of* $\mathcal{M}$ *by setting* $f(x, y) = 1$*.*

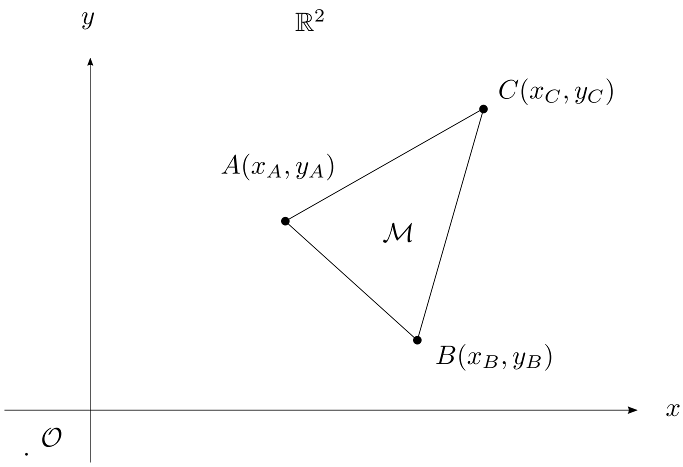


Figure 1: Set $M \in \mathbb{R}^2$.

We will consider two scenarios

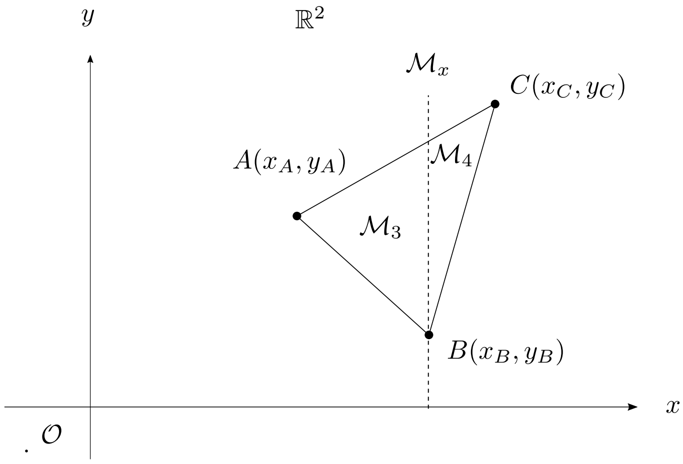


Figure 2: Set $\mathcal{M} = \mathcal{M}_1 \mathcal{M}_2 \in \mathbb{R}^2$.

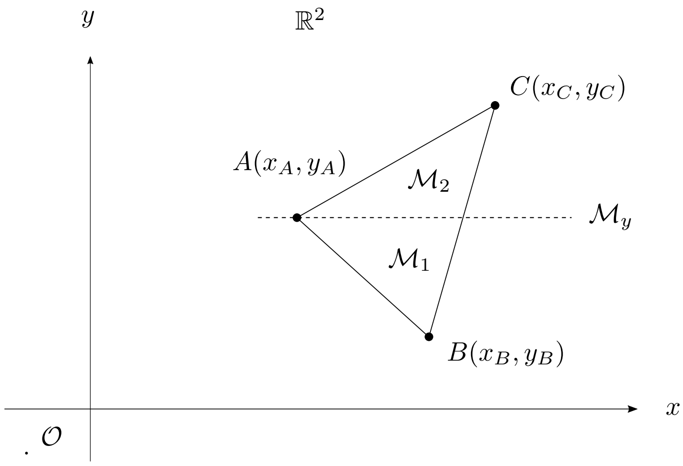


Figure 3: Set $\mathcal{M} \in \mathbb{R}^2$.

**Recall 1.** *Equation of a line $(l)$ in general reads*

$$(l): \quad y = a\,x + b, \tag{1}$$

*where $a$ is the slope of the line, and $b$ is the point where the line $(l)$ crosses over the vertical line of the axis. Hence, when this line $(l)$ going through point $P(x_P, y_P)$ and point $Q(x_Q, y_Q)$, it leads to the following two relations*

$$y_P = a\,x_P + b, \tag{2}$$
$$y_Q = a\,x_Q + b, \tag{3}$$

*which leads to the slope $a$ and vertical point $b$ as follows*

$$a = \frac{y_P - y_Q}{x_P - x_Q}, \tag{4}$$
$$b = \frac{-y_P\,x_Q + y_Q\,x_P}{x_P - x_Q}. \tag{5}$$

*Finally, equation of a line* $(l)$ *passing through point* $P(x_P, y_P)$ *and point* $Q(x_Q, y_Q)$ *in general takes the form*

$$\therefore \quad \boxed{y = \frac{y_P - y_Q}{x_P - x_Q}\, x + \frac{-y_P\, x_Q + y_Q\, x_P}{x_P - x_Q}.} \tag{6}$$